

§ 319 Grant Funding Request for Proposals 2006



Nonpoint Source Pollution Control

Proposals due May 19, 2006

Submit proposal (two paper and one electronic copy) to:

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Office of Environmental Assessment
P.O. Box 4314
Baton Rouge, LA 70821-4314
(225) 219-3595
John.J.Clark@LA.gov

(No Faxes. Electronic Copies must be in MS Word)

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Request for Proposals for Fiscal Year 2006

Louisiana Department of Environmental Quality

Nonpoint Source §319(h) Funding

Introduction

The Louisiana Department of Environmental Quality (DEQ) is seeking proposals from government agencies and nonprofit organizations to address nonpoint sources of pollution in the state. Federal grant monies will be available under Section 319(h) of the Clean Water Act. Funding and oversight of selected proposals will be administered by the Water Quality Assessment Division of the DEQ.

Who is eligible to apply?

The following agencies and organizations are eligible to apply for and receive 319 funds:

- State and local governments
- Non-government organizations
- Non-profit organizations
- Federally recognized tribal groups within Louisiana

Purpose of This Request for Proposal (RFP)

The Louisiana Department of Environment Quality (LDEQ) is requesting project proposals for fiscal year 2006.

LDEQ is offering grant funds for projects that will provide watershed improvement initiatives and reduce nonpoint source water pollution.

Nonpoint source (NPS) pollution is the leading cause of water quality degradation in the United States and poses a substantial problem for the health of Louisiana's streams and rivers. These grant funds are being made available under §319(h) grants of the Clean Water Act, to state and local governments, non-government organizations, non-profit organizations, and federally recognized tribal groups within Louisiana to address NPS water pollution.

Scope of Work

In the 2006 RFP, the LDEQ 319 Nonpoint Source Water Program is requesting project proposals for the purpose of implementing on-the-ground projects that are aimed at controlling, reducing, and/or managing nonpoint source pollution.

Funding priority will be given to proposals that include a project and/or program designed and intended for addressing waterbody impairments caused by nonpoint source pollution on a stream subsegment(s) currently listed on the Louisiana 2004 303(d) List of Impaired Waterbodies or a subsegment(s) at risk of becoming impaired by nonpoint source pollution. Project proposals addressing source water protection will also be considered. Proposals are requested for projects or programs that can provide nonpoint source pollution awareness/education/outreach, BMP demonstration, BMP implementation, or a combination of these elements.

Special consideration will also be given to project proposals addressing waterbody subsegments where a TMDL has been developed. A list of approved TMDLs can be viewed at <http://www.deq.louisiana.gov/portal/tabid/1563/Default.aspx>. Impaired watershed subsegments are listed in Appendix A of the Louisiana Water Quality Integrated Report which can be viewed at <http://www.deq.louisiana.gov/portal/Default.aspx?tabid=98>.

Targeted watershed basins for FY '06 are the Ouachita, Barataria, and Terrebonne Basins. Other watershed basins in the state will also be considered. Appendix A contains maps depicting the targeted watershed basins along with the impaired water body subsegments highlighted. We encourage you to review the "Louisiana Nonpoint Source Management Plan" by going to our website, <http://www.deq.louisiana.gov/portal/tabid/2375/Default.aspx> to become familiar with our program's goals, objectives, and timeline. The "Nonpoint Source Management Plan" was developed by LDEQ and outlines the state's watershed management strategies to restore the designated uses to impaired waterbody subsegments. A list of all the impaired waterbody subsegment(s) in Louisiana can be found on the most currently approved 303(d) list (Appendix A of Louisiana Water Quality Integrated Report). The plan includes LDEQ's process for achieving this goal and a timeline for implementing restoration actions.

LDEQ and EPA are placing strong emphasis on achieving measurable results. Highest priority will be given to projects that are designed, implemented, and monitored to show measurable results such as quantifying instream water quality improvements, estimating or modeling pollutant load reductions, implementing innovative BMP projects to control nonpoint pollution, or documenting knowledge improvements or changes in behaviors resulting from educational project efforts that lead to improved water quality. Educational projects shall include a mechanism to measure their effectiveness.

Proposed educational programs should promote broad awareness and implementation of activities that can help protect waters from degradation by new and expanding land use activities that increase nonpoint source pollution. This is in recognition of the continued need to prevent waters that currently are not impaired by nonpoint pollution from becoming impaired. This is particularly true for those waters whose water quality is threatened by changing land uses. We expect that educational proposals should relate to an entire basin or watershed.

Required Format for Project Proposals

Project proposals MUST use the following format. Font size should be 12pt. Page layout for all pages should be on the vertical plane. Feel free to use bullets, where appropriate, instead of using complete sentences. Proposal work descriptions should be brief. Concise documents are encouraged as long as the following information is adequately addressed.

I. Cover Sheet (Appendix B)

- **Project Title**
- **Name of Grant:** FFY 2006 Section 319(h)
- **Proposed Budget:** Federal amount \$
 Match amount \$ (40% of Total amount)
 Total amount \$
- **Project Funding Period:** Projects are typically funded for a period of 36 months.
- **Project Area:**
 - Louisiana 8-digit watershed subsegment code(s) (Appendix C)
 - List if a TMDL has been approved or is under development for that watershed (Appendix C). Also include the 303(d) listed impairment for that watershed (Appendix C).
- **Sponsoring Cooperator:**
 - Mailing address
 - Contact person: name, mailing address, phone, fax, and email address
 - Federal taxpayer I.D. number
- **Date Submitted:**

II. Executive Summary (limit one page)

- This should be a brief summary of project suitable for public distribution. Information given should be sufficient to clearly understand the purpose of the proposed work. Include technical language where appropriate.

III. General Description of Watershed

- Location (include 8 ½ x 11 copy of USGS 1:24000 scale topographic quadrangle map with project boundaries). Maps can be created using LDEQ Make-A-Map (Appendix C).
- Size
- Location of priority funding areas
- Major initiatives underway or planned
- Unique characteristics
- Water quality impairment identified under the 303(d) list (Appendix C)
- Summarize any past assessment reports, studies, implementation projects that identify water quality threats or problems.

IV. Project Goal and Objectives (limit to one page)

- **Goal:** Describe the condition you wish to change; a single statement summarizing the overall purpose of the project
- **Objectives:** List statements of what is to be accomplished in a measurable, practicable form. Include desired outcomes of your work activities, rather than the activities themselves. Implementation projects should emphasize the measures that will actually be implemented during the project period.
- **Measurable Results:** Link project objectives to expected measurable environmental results (e.g., miles of stream to be restored, acres of wetlands created, pounds of pollutants removed, habitat improvement, etc.). Describe appropriate monitoring components or other evaluation methods to determine the effectiveness of the project. For direct implementation projects, e.g., those designed to reduce sediment or nutrient loads, load reduction estimates must be provided in your proposals. See Appendix D for additional information about measurements of success.

V. Project Activities and Deliverables - Please provide the following information for each objective listed under your goal.

- **Activities:** Specific task(s) to accomplish each milestone
- **Funds:**
 - Federal funds requested for each specific task
 - Matching funds provided for each specific task
- **Timeline:** Period of time in which each activity will take place (e.g. Month 1 – Month 8)
- **Responsible entity:** Group or individual responsible for the activity
- **Deliverables:** Anticipated accomplishments or outcomes for each activity expressed in quantifiable terms; these are measures of success, include a completion date for deliverables (QAPP, quarterly progress reports, manuals, maps, pictures, draft and final reports, etc.)

VI. Detailed Project Budget – Please provide total budget summary (Appendix B).

Personnel (Salary and Fringe) List position titles, number of personnel, and fringe.

Training (in state/out of state) Include total amount requested and characterize the type of training (e.g., ArcInfo Training).

Operating Service Specify items (including fax, telephone charges) and total.

Travel/Conferences (in state/out of state) List trip amounts, including the mileage, per diem, estimated number of trips in-state and out-of-state, and other costs.

Equipment Identify each item of equipment to be purchased which has an estimated acquisition cost of over \$1,000 either as an individual piece, or as a group of pieces intended to be used together and which has a probable useful life of more than one year

beyond the date of acquisition. The equipment listed should be necessary tools for the completion of the proposed project.

Materials & Supplies “Supplies” means all tangible property other than “equipment.” The budget detail should be specific in identifying categories of supplies to be procured, e.g., laboratory or office supplies. Specifically list all software to be purchased.

Indirect Costs

Note: Stream restoration projects should have funds focused on implementation activities (e.g., construction), not design activities.

VII. Budget Justification - Detailed explanation and justification of costs in budget (Appendix B)

Guidelines for Project Proposals

I. Ineligible Activities

Section 319 funds may not be used to implement specific requirements of draft or final NPDES stormwater permits or to implement permit application requirements of EPA’s storm water regulations. Funds may not be used to pay for best management practices or “end of pipe” treatments that are required as part of a draft or final NPDES permit.

In addition, **all applicants must be up-to-date on the submission of progress reports, invoices and other deliverables pursuant to any currently funded projects with LDEQ.** Incomplete proposals that do not include all requested information will be disqualified for consideration.

II. Required Matching Funds

LDEQ requires that all proposals that are submitted for funding consideration include a minimum 40% non-federal match for all federal dollars. These match funds may be cash or in-kind services that are not provided by federal funds or used to match other sources of federal funds. Matching funds must be fully documented, and must meet the same eligibility requirements as federally funded portions of the grant.

Formula for Calculation of Match

Sample Calculation

$$\frac{\text{Federal Amount Requested}}{60\%} \times 40\% = \text{Match}$$

$$\frac{\$6,000.00}{.60} \times .40 = \$4,000.00 \text{ Match}$$

\$10,000 Total Project Budget

III. Quality Assurance Project Plan

All projects that include environmental monitoring, measurements, or data collection must have an approved Quality Assurance Project Plan (QAPP) in place PRIOR TO THE START OF DATA GENERATION OR EQUIPMENT PURCHASE. **If the proposed project will include monitoring, measurements, or data collection, a draft copy of Sections A5 - Problem Definition and Background, A6 - Project/Task Description, B1 - Sample Process Design, and B2 - Sampling Methods of the QAPP must be completed and submitted with the proposal.** If a project will require a QAPP, all budgetary, timeline, and other associated provisions should be addressed and outlined in the proposal. Refer to the web link in Appendix C for EPA guidance on QAPPs. An example QAPP is located in Appendix E.

IV. GIS Requirements

Geographical Information Systems (GIS) is a method for capturing, storing, checking, integrating, manipulating, analyzing, and displaying spatially referenced data both digitally (softcopy) and through hardcopy maps. All Section 319 funded projects/activities including a GIS component must follow GIS guidelines in order to be compatible and acceptable by LDEQ. If the applicant involved is not capable of following these guidelines, the proposed GIS project will not be eligible for funding, as this may affect the technical competency of the project. Specific GIS guidelines and references are available in the attached Appendix F.

V. Submission of Proposals

**Proposals should be received by LDEQ by 4:00pm
on the following date:**

May 19, 2006

Proposals should be received by LDEQ no later than 4:00 pm on May 19, 2006 for consideration in the FY 2006 319 grant package. Faxes will not be accepted. Two copies should be mailed or delivered, and one copy transmitted electronically to:

John James Clark
Louisiana Department of Environmental Quality
Office of Environmental Assessment
P.O. Box 4314
Baton Rouge, LA 70821-4314
(225) 219-3595
John.J.Clark@LA.gov

Schedule

LDEQ will make every effort to adhere to the following schedule:

Tentative Action	Responsibility	Expected Date
Issue RFP	DEQ	April 7, 2006
Deadline for Proposal Submission	Project Applicant	May 19, 2006
Proposal Evaluation	DEQ	Thru May 31, 2006
Workplan Submittal to EPA	DEQ	August 11, 2006
Workplan Approval	DEQ, USEPA	September 29, 2006
Notification to Successful Applicants	DEQ	October 2, 2006
Contracts Awarded	DEQ, Project Applicant	January 1, 2007

Proposal Checklist

Cover Sheet
Executive Summary
General Description of Watershed
Project Goal and Objectives
Project Activities and Deliverables
Detailed Project Budget
Budget Justification
QAPP sections A5, A6, B1, and B2 for projects that will include monitoring, measurements, or data collection
Submit two paper copies of the proposal
Submit an electronic version of the proposal in MS Word via e-mail or on CD-ROM.

Reimbursement Guidelines

Funds provided through Section 319 are reimbursable. Specifically, funds are expended by the contracted organization and then reimbursed by DEQ. **Advance payments are not provided through this grant.**

Invoices with appropriate qualifying documentation must be submitted for reimbursement on a quarterly basis along with a Quarterly Project Monitoring Report and work product deliverable as described in the project's Scope of Services.

Reporting Requirements for "Approved Projects"

Approved projects are required to report the project work progress and/or project status to LDEQ through submittal of the following documents:

Quarterly Monitoring Reports document progress toward achievement of the milestones. They contain information about 1) activities scheduled for the quarter, 2) activities conducted during the quarter, and 3) an explanation of any discrepancies between the two, if necessary. Quarterly reports are due in January, April, July, and October.

Annual Reports summarize the progress of the project towards the achievement of milestones. They contain a summary of the information contained in all of the Quarterly Monitoring Reports for the past year. Annual Reports are due on January 1.

Final Reports are lengthier, more substantial reports. They contain summaries of activities conducted over the entire project period and, more importantly, report conclusions. Whereas the Quarterly Monitoring Reports document what happened, the Final Report documents the significance of the activities conducted during the grant period. The final report should contain enough detail so that a person who is not familiar with the project can read it and understand the project's 1) goals, 2) methods, 3) achievements, 4) significance, and 5) recommendations. With the final report, project contractors must submit a one page abstract suitable for distribution in newsletters, on-line, etc. Final reports are due within 60 days of the completion of the project.

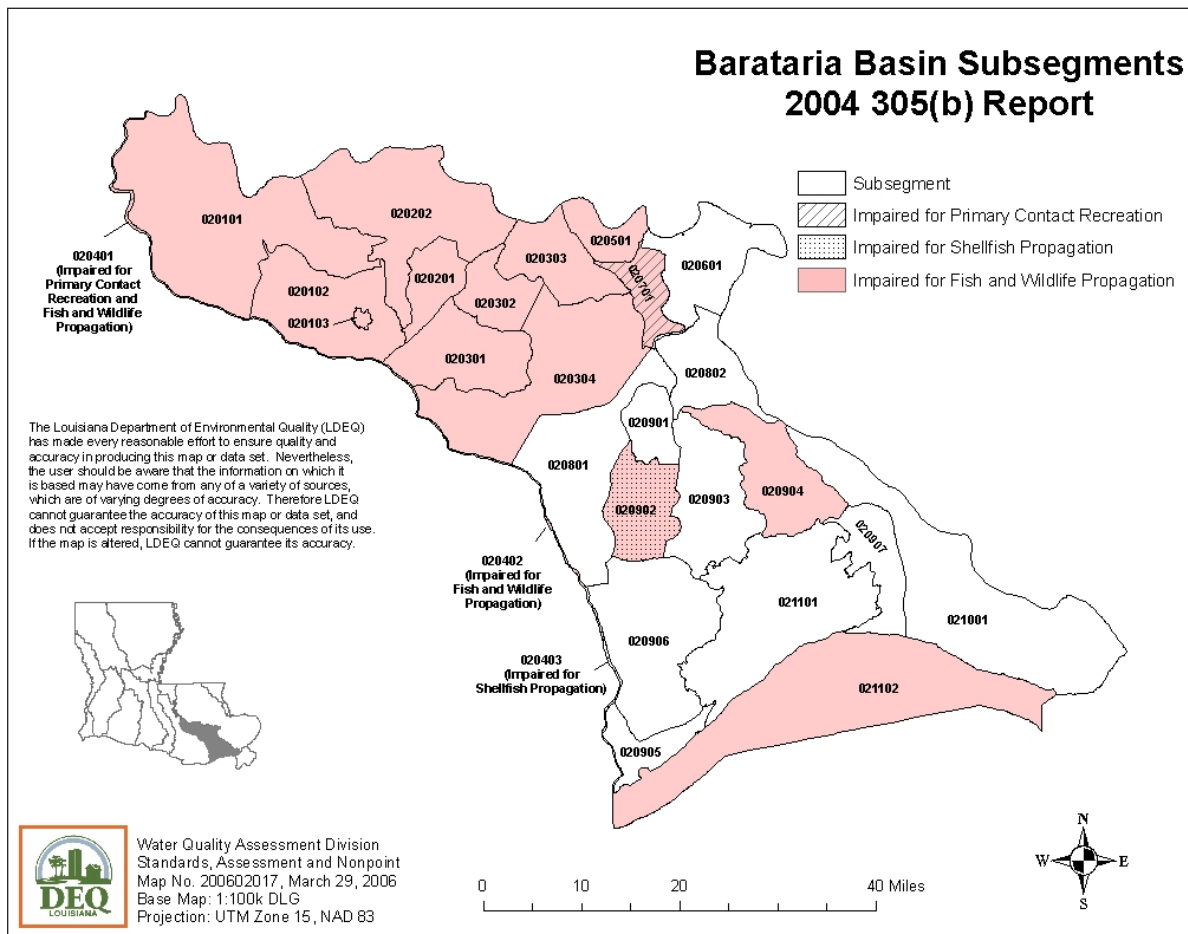
Photographs – Project related photographs are encouraged since they help illustrate and document project progress. When applicable before and after photographs and photographs documenting project actions taken should be submitted with Quarterly Monitoring Reports and included in Annual and Final Reports.

Measurable Environmental Results (MERs) - EPA is requiring that all 319 funded projects report measurable environmental results (MERs). The intent of MERs is to focus on implementation of nonpoint source controls, specific educational activities, water quality improvements, and specific nonpoint source load reductions. Projects should describe implementation of NPS controls (e.g., type of BMPs), miles of stream to be restored, acres of wetlands created, habitat improved, etc. Projects should also describe specific locations where BMPs are to be implemented.

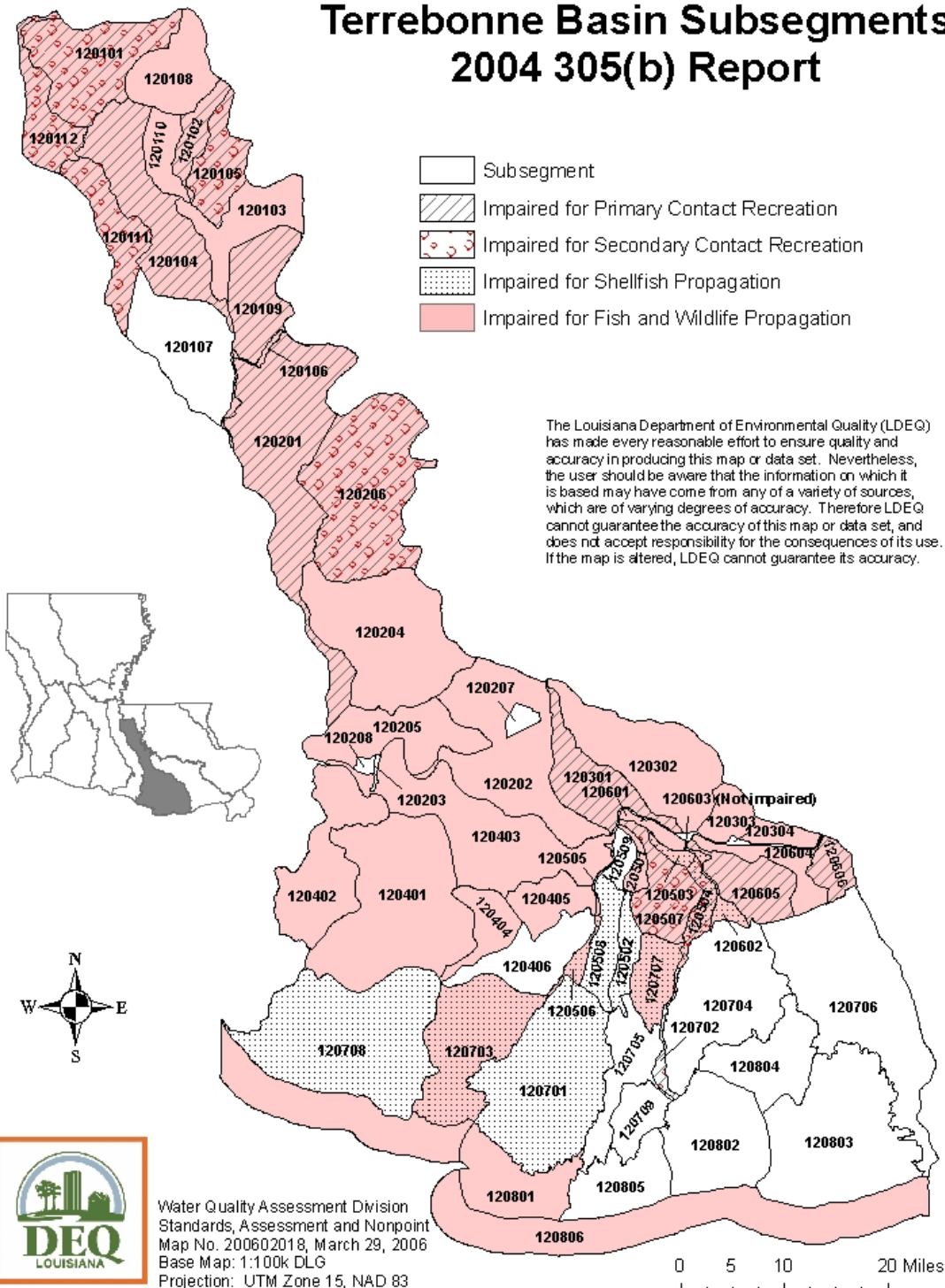
Education projects should describe the number of people that received brochures or pamphlets, responded to surveys, or attended events, etc. For direct implementation projects e.g., those designed to reduce sediment/nutrient loads, load reduction estimates must be provided in your scope of work. In addition, actual load reductions must be reported after one year of project implementation. Implementation projects that are completed in less than a year will need to report load reduction estimates at the time of completion. Nonpoint pollutant load reduction estimates may be based on the USDA Revised Universal Soil Loss Equation (RUSLE) or other acceptable methods for calculating nonpoint pollutant load reductions estimates. Projects should clearly identify which methodology has been chosen to calculate load reductions. MER information collected by the Nonpoint Source Program will be reported in EPA's Grant Reporting and Tracking Database.

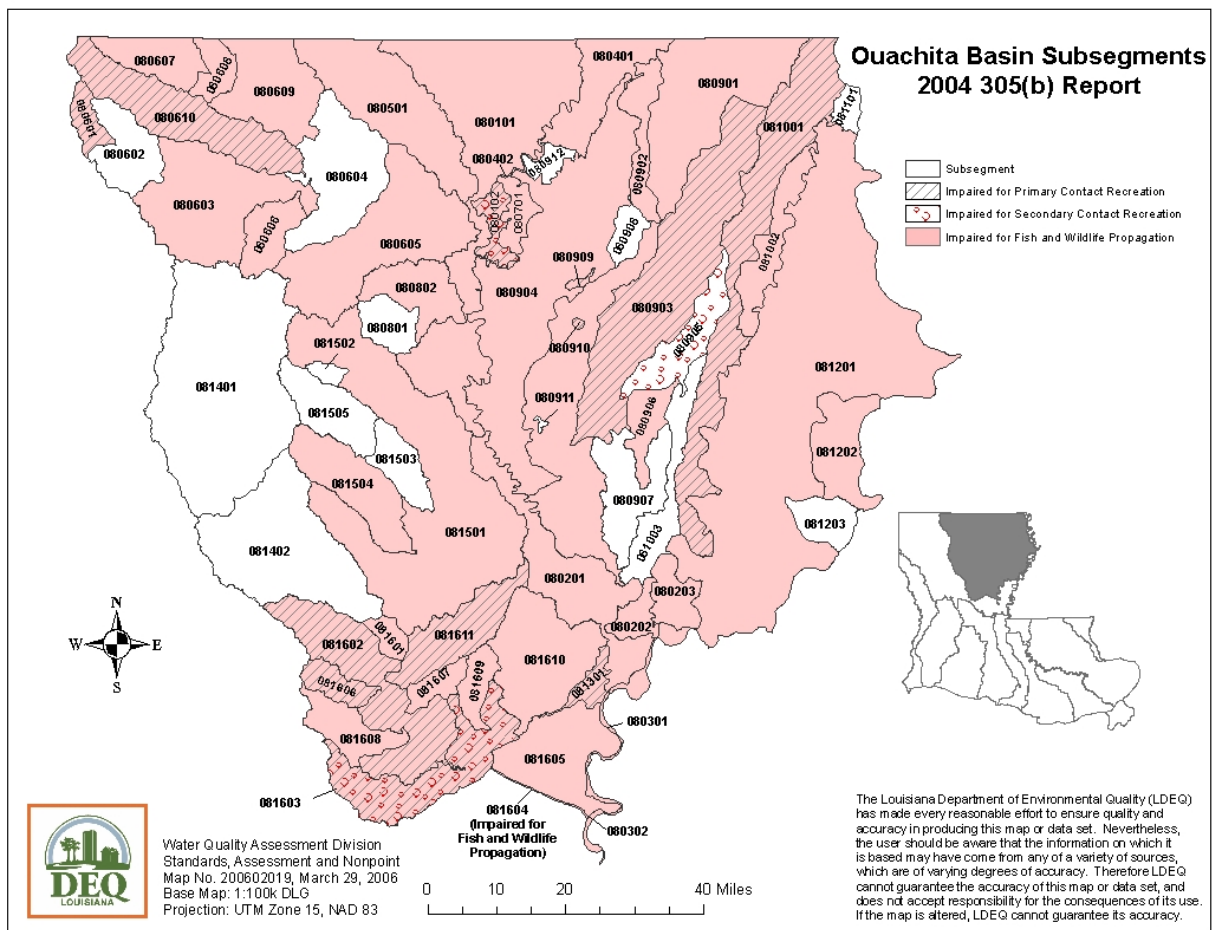
APPENDIX A – Basin Maps

Barataria Basin Subsegments 2004 305(b) Report



Terrebonne Basin Subsegments 2004 305(b) Report





APPENDIX B – Cover Sheet, Budget, and Budget Justification

I. Sample Proposal Cover Sheet

Project Title: “Control of NPS Pollutants from Runoff”

Grant: FFY 2006 Section 319(h)

Proposed Budget: Federal Amount	\$150,000
<u>Match Amount</u>	<u>\$100,000</u> (40% of Total Amount)
Total Amount	\$250,000

Project Funding Period: 36 Months.

Project Area: All waterbodies in urbanizing areas of west XYZ Parish including:

- 040801 – Upper Tchefuncte River (Headwaters to Bouge Falaya River)
- 040802 – Tchefuncte River (Bogue Falaya River to Hwy 22)
- 040803 – Lower Tchefuncte River (La 22 to Lake Pontchartrain)
- 040804 – Bogue Falaya River
- 040901 – Bayou Lacombe (Headwaters to US 190)
- 040902 – Bayou Lacombe (US 190 to Lake Pontchartrain)
- 040903 – Bayou Cane (Headwaters to US 190)
- 040904 – Bayou Cane (US 190 to Lake Pontchartrain)

No TMDLs have been completed for any of the above waterbodies.

303(d) listed impairments: Mercury, Total Fecal Coliform, Dissolved Oxygen, Chloride, Dissolved Copper, Turbidity

Sponsoring Cooperator: West XYZ Parish Government
P.O. Box 1234
Somewhere, LA 70000

John Smith, Environmental Coordinator
987-654-3210 Office
987-654-0123 Fax
John.Smith@something.com
Federal Tax ID: 89-78623482

Date Submitted: February 20th, 2006

II. Sample Detailed Project Budget

Categories	Federal	Match	TOTAL
Personnel			
Faculty		108,975	108,975
Graduate Students (3)	148,500		148,500
Fringe Benefits of Faculty @ 22.5%		24,519	24,519
TOTAL PERSONNEL	148,500	133,494	281,994
Travel			
Field work	15,000		15,000
Meetings and workshops	3,000		3,000
TOTAL TRAVEL	18,000		18,000
Training			
ArcGIS Training	1,000	500	1,500
TOTAL TRAINING	1,000	500	1,500
Materials & Supplies			
Flume material, water quality			
field monitoring materials, lab analyses			
materials and supplies, etc.	20,000		20,000
TOTAL MATERIALS & SUPPLIES	20,000		20,000
Equipment			
Automated ISCO Samplers (6)	30,000		30,000
Hydrolab	6,000		6,000
Weather station	3,000		3,000
PC Workstation	2,000		2,000
TOTAL EQUIPMENT	41,000		41,000
	9,000		9,000
Operating Service			
TOTAL DIRECT COSTS	237,500	133,994	371,494
Indirect Costs @ 21%	49,875		49,875
Indirect Costs @ 43%		57,617	57,617
TOTAL COSTS	287,375	191,611	478,986

III. Sample Budget Justification

Personnel **Federal: \$148,500** **Match: \$108,975**

Three Ph.D. graduate students will be recruited to conduct field and laboratory work. The financial support for their tuition and other related costs are calculated based on an annual salary of \$16,500 for each student. Four investigators will work on preparation, implementation, and management of the project and oversight of the project budget. Quarterly and annual reports will be performed by the investigators. Their time will be utilized to match the federal funds requested for this project.

Fringe Benefits **Federal: \$0** **Match: \$24,519**

Fringe benefits are calculated 22.5% of salaries.

Travel **Federal: \$18,000** **Match: \$0**

Travel costs are estimated for field work and meetings/workshops that will be needed for cooperation with project partners. In total, 30 monthly field trips (2 ½ years) are planned to collect water quality samples and conduct field measurement of water quality indicators, stream flow, and sedimentation for this three-year project. We anticipate that three graduate students will mostly work together in the field; the estimated cost for each trip is \$600. Meetings and workshops are needed for cooperation between investigators and project partners.

Training **Federal: \$1,000** **Match: \$500**

Training will be needed to educate one graduate student on ArcGIS software to document project location and progress.

Materials & Supplies **Federal: \$20,000** **Match: \$0**

Materials and supplies will be needed for field water quality monitoring (40%) and laboratory analyses (54%). They will also cover the cost for project reporting and publication of results.

Equipment **Federal: \$41,000** **Match: \$0**

The Louisiana State University Agricultural Center will provide general field and laboratory equipment. However, because of low discharges and water velocities associated with headwater streams in Louisiana, portable and precise field equipment is needed. They include six automated ISCO sampler systems and accessories, a portable Hydrolab, and an automated weather station. One PC Workstation is requested for handling large data sets, GIS-based watershed modeling, and visualization and mapping processes.

Operating Services**Federal: \$9,000****Match: \$0**

Operating costs are estimated based on \$3,000 per year, i.e., \$9,000 for the entire three-year project period. These costs include repair and maintenance of field and laboratory equipment.

APPENDIX C - Important Website Links

The 2004 Integrated Report (including 305(b) and 303(d) list) can be found at:
<http://www.deq.louisiana.gov/planning/305b/2004/index.htm>

Information on TMDLs:
<http://www.deq.state.la.us/technology/tmdl/>

Louisiana HUC Codes:
http://cfpub1.epa.gov/surf/locate/hucperstate_search.cfm?statepostal=LA

LDEQ Make-A-Map
<http://map.deq.state.la.us/>

319(h) Grant success stories:
<http://www.epa.gov/owow/nps/cwact.html>

The Louisiana Water Quality Management Plan – Volume 6 – Nonpoint Source Management Plan:
<http://nonpoint.deq.state.la.us/99manplan/DOCUMENT%20INDEX.htm>

QAPP Guidance (only needed for approved projects):
http://www.epa.gov/quality/qa_docs.html#EPArqts

APPENDIX D - Measures of Success

Federal, State, and other public and private partners have adopted core indicators to report nationally to measure attainment of five specific objectives.

The five objectives are: (1) Preserving and enhancing public health, (2) Preserving and enhancing ecosystem health, (3) Supporting uses designated by States and Tribes in their water quality standards, (4) Conserving or improving ambient conditions, and (5) Reducing or preventing pollutant loadings and other stressors.

For nonpoint source pollution control, these five objectives are characterized by the following measures and indicators; Water Quality Improvements from NPS Controls, NPS Pollutant Load Reduction, Public Education, Awareness, and Outreach, and Implementation of NPS controls. The approaches shown below have been successfully used as water quality and implementation measures of success, as well as measures of enhanced public education, awareness, and action. They are presented as examples – projects may identify and use other measures and indicators from each of the categories set forth. Well-designed projects should have several appropriate measures from each of the categories below. All measures of success should be quantifiable.

Measures & Indicators:

I. Water Quality Improvements from NPS Controls

- Number of river or stream miles, lake acres, and estuarine and coastal square miles that fully support all designated uses
- Number of river or stream miles, lake acres, and estuarine and coastal square miles that come into compliance with one or more designated uses, or with one or more numeric water quality criteria
- Demonstrable improvements in relevant surface water quality parameters
- Demonstrable improvements in biological or physical parameters
- Prevention of new impairments

II. NPS Pollutant Load Reduction

- Reductions in pollutant loading from NPS in defined priority watersheds
- Statewide reduction in NPS pollutant loadings in the case of NPS pollution which may result from activities conducted in the future, prevention or minimization of new loading by reductions from existing sources

- Reductions in frequencies, or prevention of increases of peak flows in developing or developed areas

III. Public Education, Awareness, and Outreach

- Participation rates in education programs specifically directed to solving particular NPS pollution problems
- Statistically based survey of public awareness knowledge, and action to measure changes in attitudes and action over time
- Participation rates in various NPS activities such as citizen monitoring and watershed restoration activities
- Participation rates in various public awareness education efforts

IV. Implementation of NPS controls

- Number of measures implemented in watersheds with impairments
- Percentage of management measures needed in watershed with impaired waterbodies to show an improvement in water quality
- Number of approved or certified plans written to address specific pollutants of concern, e.g. sediment control, nutrient management, storm water
- Statistically based survey of implementation rates of approved and suggested BMPs and their perceived effectiveness by the user.

APPENDIX E – Quality Assurance Project Plan (QAPP)

**Constructed Wetlands to Improve Water Quality for
Whole-Farm Operations**

Quality Assurance Project Plan

DEQ CONTRACT NO. CFMS 597521

Revision # 0

Submitted to:
Louisiana Department of Environmental Quality
Office of Environmental Assessment
602 North Fifth Street
Baton Rouge, Louisiana
70802

July 9, 2004

Submitted by:
Red River Research Station
Louisiana Agricultural Experiment Station
LSU AgCenter
Bossier City, Louisiana
71113

Document Review and Revision Record

Note: Actions older than 5 yrs may be removed from this record

Date	Revision No.	Record of Activity
	0	Initial document approved.

Group A: Project Management

A.1 Title and Approval Sheet

Mr. James L. Rabb, Principle Investigator
Red River Research Station
LSU Agricultural Center

Date: _____

Dr. Eddie P. Millhollon, Co-Principle Investigator
Red River Research Station
LSU Agricultural Center

Date: _____

Dr. John L. Carr
Organization Quality Assurance Officer
The University of Louisiana at Monroe

Date: _____

Ms. Sunita Singhvi, Chief
Assistance Programs Branch
U.S. Environmental Protection Agency, Region 6

Date: _____

Mr. Jay Harris, Project Officer
State/Tribal Programs
U.S. Environmental Protection Agency, Region 6

Date: _____

Mrs. Barbara Romanowsky, Administrator
Environmental Planning Division
Louisiana Department of Environmental Quality

Date: _____

Ms. Jan R. Boydstun, ES Supervisor
Louisiana Department of Environmental Quality

Date:_____

Mr. Jeff Parham, Project Manager
Louisiana Department of Environmental Quality

Date:_____

Ms. Raye Gendron, Quality Assurance Officer
Office of Environmental Assessment
Louisiana Department of Environmental Quality

Date:_____

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A.4 Project/Task Organization

The organization of the project team for the “Constructed Wetlands to Improve Water Quality for Whole-Farm Operations” is presented in Figure A.4.1. A brief review of the primary staff and responsibilities for the project management, quality assurance, and peer review is given below.

Project Management:

LSU AgCenter Principal Investigator – Mr. J. L. Rabb, Professor of Agronomy at the Red River Research Station in Bossier City, is the principal Investigator and project manager. He has responsibility for overall coordination and decision making, directing project planning activities and is responsible for overall technical quality and consistency of all project activities and deliverables.

LSU AgCenter Co-Principal Investigator – Dr. Eddie P. Millhollon, Associate Professor of Agronomy, Physiology, and Weed Science at the Red River Research Station in Bossier City is co-principal Investigator and project quality assurance officer. He has responsibility for directing project planning activities and is responsible for overall technical quality and consistency of all project activities and deliverables. He is responsible for the acquisition, verification, and transfer of data to database, ensures that the data management checklist is filled out and submitted with the data, maintains records of data submissions to resolve problems with those submissions, and maintains contact with project management to ensure coordination of issues.

LDEQ Environmental Scientist Supervisor - Jan R. Boydstun is responsible for incorporating results of project into appropriate parts of non-point source (NPS) management program and direction of staff in utilization of data to solve NPS problems.

LDEQ Project Manager – Jeff Parham is responsible for project oversight, review of all quarterly, annual, and final reports and reporting of status to EPA.

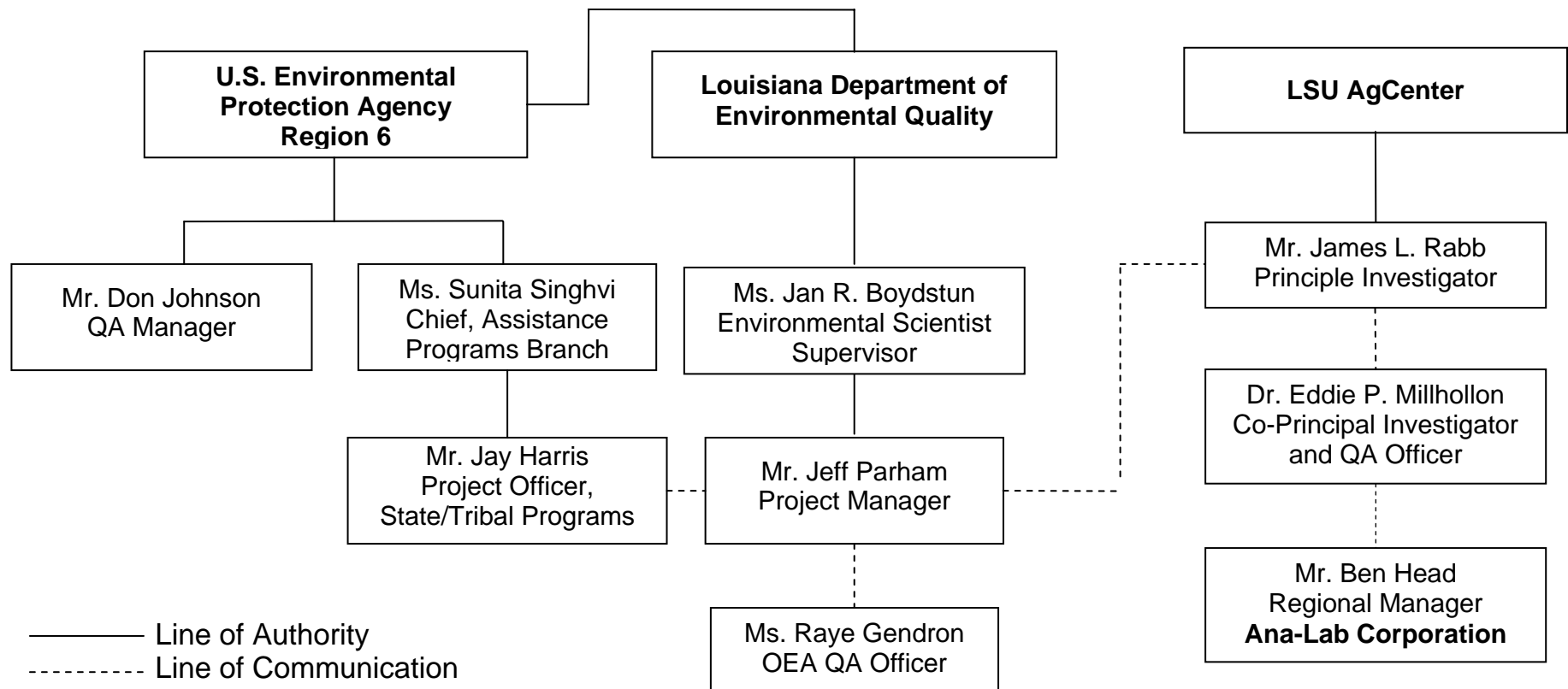
EPA Region 6 – is responsible for review and approval of the Quality Assurance Project Plan (QAPP), and review and final approval of all semi-annual and final reports related to the projects.

Quality Assurance

LSU AgCenter Quality Assurance Officer – Dr. Eddie Millhollon is responsible for planning, implanting, and tracking quality assurance activities, and preparation of this QAPP.

LDEQ Quality Assurance Officer – Raye Gendron is responsible for LDEQ overview and approval of the QAPP.

Figure A.4.1. Project Team Organization for the Constructed Wetlands to Improve Water Quality for Whole-Farm Operations project.



A.5 Problem Definition /Background

Over 25,000 acres of agricultural crop land and 29,000 acres of pasture land reside within LDEQ's water quality sub-segments 100402 and 100406 (LDEQ, 2000). The Flat River and Red Chute Bayou drain these segments and, based on the 2000 Water Quality Inventory 305(b) Report, these two water bodies only partially meet their designated uses. The Flat River/Red Chute Bayou watershed is on the 1999 court-ordered 303(d) list of impaired waters in Louisiana. The primary suspected causes of this impairment are organic enrichment, low dissolved oxygen, nutrients, pesticides, suspended solids, siltation, and pathogen indicators resulting from non-irrigated crop production. LDEQ is currently developing total maximum daily loads (TMDLs) for this watershed.

Although agricultural practices such as conservation tillage help reduce non-point source discharges, they are only partially effective. However, limited information indicates that constructed wetlands have been used successfully for the treatment of non-point discharges from agricultural sources, removing 90 percent of total phosphorous and suspended solids, 80 percent of chlorpyrifos and metolachlor, and 50 percent of atrazine (DuPoldt *et al.*, 1993 and M. T. Moore, 1999). Constructed wetlands remove sediment through physical means and pesticides and fertilizer through biological means provided by plants and microorganisms.

The LSU AgCenter's Red River Research Station consists of 573 acres of agricultural land located in the Red River Basin. Runoff water from the station drains into the Flat River, which is located less than one-third mile away. Approximately 400 acres of discharge water from the station flows to the southeastern corner where it enters Lay's Bayou, then Flat River. The southeast corner of the station is therefore an ideal location to construct a wetland to demonstrate the potential for improving the water quality of discharge from agricultural lands prior to drainage into state water bodies.

A.6 Project/Task Description

This project will examine the potential of a constructed wetland to improve water quality of runoff from over 400 acres of agricultural land. The effectiveness of this system will be determined by sampling water at various points along the path of the system, from the point where runoff enters the wetland, to the point where it leaves. Specific objectives to be determined include:

1. With the guidance of engineers from the NRCS, construct a wetland in the Red River Basin that will accommodate discharge from 400 acres of agricultural land.
2. To determine the efficacy of a constructed wetland in improving water quality of agricultural discharge prior to entering an impaired water body. Those constituents suspected of causing impairment to the Flat River will be examined at stages throughout the system to determine the efficacy of the system.
3. Develop and implement an educational outreach program to inform agricultural producers of the benefits that can be derived from the construction of a wetland.

The project design is as follows:

1. An area located in the southeast corner of the LSU AgCenter's Red River Research Station has been surveyed by personnel of the NRCS to identify the best location for a constructed wetland.

2. Following the survey, NRCS engineers designed a constructed wetland that will accommodate runoff from approximately 400 acres (Figures A.6.1, A.6.2, and A.6.3).
3. The wetland consists of 3 key areas. Runoff from 400 acres will enter the wetland through 3 drainage ditches. At the point where the drainage ditches enter the shallow portion of the wetland, soil will be excavated so that each will have a depth of approximately 6 feet. This depth will allow most sediment to fall out before water enters the shallow wetland. Figures A.6.1, A.6.2, and A.6.3 illustrate the wetland and the land area it will accommodate.
4. The shallow wetland will be approximately 5 acres and will range in depth from 0 to 18 inches. Native aquatic plants indigenous to the area have been collected and placed in a nursery until they can be transplanted to the shallow wetland. The plants collected include:
 - a. Rose Mallow (*Hibiscus lasiocarpus* Cav.)
 - b. Delta Duck Potato (*Sagittaria platyphylla* (Engelm.) J. G. Smith)
 - c. Erect Burhead (*Echinodorus rostratus* (Nutt.) Engelm. ex Gray)
 - d. Royal Flatsedge (*Cyperus elegans* L.)
 - e. March Flatsedge (*Cyperus pseudovegetus* Steud.)
 - f. Pickerel Weed (*Pontederia cordata* L.)
 - g. Eastern Gamagrass (*Tripsacum dactyloides*)
 - h. 'Alamo' Switchgrass (*Panicum virgatum*)
 - i. 'Gulf Coast' Marshhay Cordgrass (*Spartina patens*)
5. From the shallow wetland, water will enter a 2.25-acre deep wetland that will be approximately 6-feet deep. The deeper wetland serves as a "polishing" pond that provides anaerobic conditions necessary for denitrification of nitrates and breakdown of pesticides. Water will then pass through the deep wetland to a ditch leading to the Flat River through 2 48-inch culverts.
6. To monitor changes in water quality through the system, automatic water sampling stations will be located at three points. The first will be located near one of the 3 ditches that drains runoff from the 400 acres immediately before it enters the constructed wetland system. Samples from this location will be analyzed to determine quality of water entering the constructed wetland system. A second sampling station will be located on the levee separating the shallow and deep wetland. This station will sample water in the shallow wetland to determine improvements in water quality at this stage of the constructed wetland system. The third sampling station will be located at the levee that separates the deep wetland from its point of egress. This station will collect water samples from the deep wetland to determine improvements the quality of water at the final stage of the constructed wetland system.
7. Water samples will be collected for 2 years to determine the effectiveness of the constructed wetland system in improving the quality of water of runoff from over 400 acres of agricultural land. Samples will be collected when sufficient rainfall occurs to result in runoff from the 400 acres into the system. If rainfall occurs over a prolonged period, e.g. several days, samples collected for analysis will be limited to initial runoff. Intermittent samples will also be taken near the center of the shallow and deep wetlands to monitor changes in water quality between rainfall events. Samples will be analyzed for nitrates, phosphates, total nitrogen, total phosphorous, total suspended solids, total and fecal coliforms, and the herbicides atrazine and metalochlor. These intermittent sampling events will be coordinated with the HYDROLAB® *in situ* measurements to obtain a complete water quality profile.

8. Data obtained from this project will be used to determine the effectiveness of a constructed wetland in improving the water quality of runoff from a large area of farmland prior to entrance into an impaired water body.
9. Information from this project will be used to make recommendations to farmers and other interested parties.

It is hypothesized that the constructed wetland will significantly improve the quality of water that runs off of 400 acres of agricultural land before it enters the Flat River. General task descriptions and time schedules for this project are presented in Table A.6.1.

Table A.6.1. Task timeline for the Constructed Wetlands to Improve Water Quality for Whole-Farm Operations project.

Project Timeline												
Task	2003		2004				2005				2006	
	Quarter											
	3	4	1	2	3	4	1	2	3	4	1	2
Construction of Wetland	X	X	X	X	X							
Collection and Analysis of Water Samples						X	X	X	X	X	X	
Educational Tours						X	X	X	X	X	X	X
Data Analysis and Reporting				X				X				X

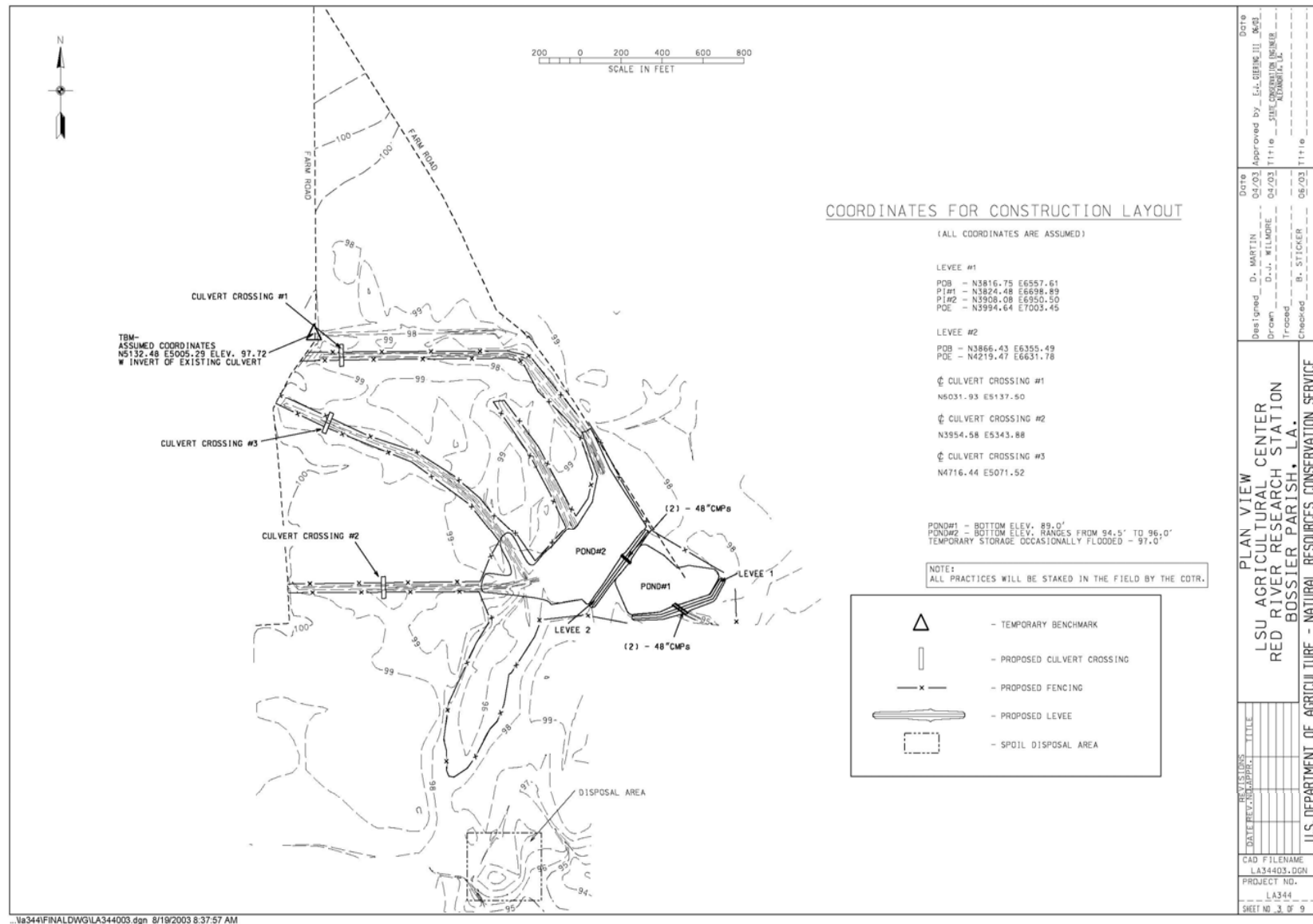


Figure A.6.1. Aerial photograph of the Red River Research Station showing proposed constructed wetland location.



Figure A.6.2. Close-up of proposed constructed wetland showing the location of automatic water samplers.

Figure A.6.2. Engineering design of constructed wetland.



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More detailed descriptions of the project tasks are as follows:

Project Schedule

1. Identify a suitable location that utilizes natural flow to install a constructed wetland that will collect runoff from approximately 400 acres of land in the Flat River/Red Chute Bayou of Northwest Louisiana.
2. Create a detailed land use map of the targeted sub-watershed using satellite/aerial images. The map will show detailed images of cropping systems utilized on the site directly affected by the constructed wetland (approx 400 acres).
3. Conduct a detailed elevation survey of the affected area and construction site. This will be accomplished with a GPS-guided system and will be conducted by personnel of the Natural Resources Conservation Service (NRCS). GPS coordinates for the site will be recorded.
4. Design constructed wetlands to accommodate runoff from approximately 400 acres. Detailed design will be done by engineers and hydrologists of the NRCS.
5. Construct wetlands as designed by NRCS personnel. This task includes excavating over 60,000 cubic yards of soil in the construction phase.
6. Excavate and distribute excavated soil on adjacent lands.
7. Install deep pond water release structure and plant appropriate vegetation in the constructed wetlands.
8. Construct access road and all necessary fencing.
9. Install erosion control vegetation mat.
10. Precision grade excavated soil and re-establish vegetation for pasture.
11. Provide electrical service and construct appropriate platforms for and install and calibrate water samplers in the constructed wetlands.
12. Install HYDROLAB®s fitted with dissolved oxygen, pH, pond level, and temperature sensors and connect data stream output from these sensors to the data logger on the samplers and have each HYDROLAB® and sampler certified by an ISCO technician for accuracy.
13. Develop Quality Assurance Project Plan (QAPP) and submit to LDEQ for approval.
14. Make corrections to QAPP as indicated by LDEQ and re-submit for approval. LDEQ will then submit QAPP to EPA for approval.

15. Collect and have analyzed water from automated water samplers to determine water quality at selected locations before, within, and exiting the constructed wetlands. Samples will be analyzed at a LDEQ Certified Laboratory. Maintain a constant log of this activity.
16. Make the public aware and knowledgeable of the constructed wetland project through school tours, field days, and a web site.
17. Request participation of personnel of the NRCS, LA Cooperative Extension Service and local Soil and Water Conservation District in the project. Meet on a regular basis with these agencies to communicate progress in the project.
18. Conduct educational tours for local schools and appropriate departments in local universities.
19. Conduct tours for producers that are directly involved in agriculture and would likely benefit from implementation of a similar project. The tours will be conducted in cooperation with the NRCS, Cooperative Extension Service, and other interested agencies.
20. Construct and maintain a website with progress of the project.
21. Tracking and reporting on progress made in the project.
22. Prepare summarized reports of progress and submit in quarterly reports to LDEQ.
23. Prepare draft of the Final Report that summarizes the activities and results of the project and submit to LDEQ for review and comment.
24. Prepare final report with changes to reflect comments by LDEQ.
25. Submit Final Report that addresses comments by LDEQ.

Sample Locations and Measurements

To monitor changes in water quality through the system, automatic water sampling stations will be located at three points:

1. The first will be located near one of the 3 ditches that drains runoff from the 400 acres immediately before it enters the constructed wetland system. Samples from this location will be analyzed to determine quality of water entering the constructed wetland system.
2. A second sampling station will be located on the levee separating the shallow and deep wetland. This station will sample water in the shallow wetland to determine improvements in water quality at this stage of the constructed wetland system.
3. The third sampling station will be located at the levee that separates the deep wetland from its point of egress. This station will collect water samples from the deep wetland to determine improvements in water quality at the final stage of the constructed wetland system.

The approximate location of each of the samplers is indicated in Figures A.6.1 and A.6.2.

The water quality parameters that will be measured for this project are listed in Table A.6.2. In addition to sampling following rainfall events that produce runoff, intermediate samples will be taken from each of the two wetland components to determine changes in water quality parameters between these events.

Table A.6.2. Water quality parameters and sampling frequency for the sampling sites.

	Parameter	Event	Sample Frequency**
#	<i>Laboratory Analysis</i>	Rain*	
1	TSS	Rain	+/- 15/yr
2	TKN	Rain	+/- 15/yr
3	NO ₃ ⁻	Rain	+/- 15/yr
4	Total Phosphorous	Rain	+/- 15/yr
5	PO ₄ ⁻	Rain	+/- 15/yr
6	Total Coliform	Rain	+/- 15/yr
7	Fecal Coliform	Rain	+/- 15/yr
8	Metalo chlor	Rain	+/- 15/yr
9	Atrazine	Rain	+/- 15/yr
	<i>Field Analysis</i>		
10	Temperature (C)	Rain	+/- 15/yr
11	EC	Rain	+/- 15/yr
12	pH	Rain	+/- 15/yr
13	DO	Rain	+/- 15/yr

* Rainfall events that produce runoff volumes necessary to collect enough samples for analysis. Amount varies throughout the year.

**Sampling frequency (+/- 15/year) targeted to follow field operations that disturb soil surface and increase susceptibility of measured constituents to loss and at times intermediate to those field operations.

A.7 Quality Objectives and Criteria

In order to accurately demonstrate the effectiveness of a constructed wetland in improving water quality of runoff from agricultural land, all analytical and water quality data must be of sufficient quantity and quality to:

1. Provide relevant and reliable statistical comparisons between sampling events,
2. Contribute to the evaluation of the constructed wetland, and
3. Serve as a representative model for the implementation of constructed wetlands to improve water quality of runoff from other agricultural environs.

The agricultural fields being utilized for this project are representative of the soils within the sub-watershed.

Quality Objectives

Monitoring of water quality parameters (Table A.6.2, above) will be for two years. Approximately 15 to 20 events will be measured annually per monitoring location for this duration. Timing of water quality measurement will focus on field operations that will likely increase the susceptibility of nutrients, pesticides, and organic loading in runoff events. Additional samples will be taken from the constructed wetland to characterize seasonal variability throughout the year.

The null hypothesis is that a constructed wetland will result in no significant improvement in the quality of water in runoff from over 400 acres of agricultural land. To reject the null hypothesis at a specified level of significance (0.10), thereby demonstrating the benefits of a constructed wetland, experimental error must be minimized and bias precluded. Thus, the highest level of quality management control will be used in the field (sampler operation/programming and sample collection, field analyses and transport to the laboratory), laboratory (preservation and analyses) and data management components of this project. In particular, sampling, preservation and transport will be conducted in accordance with LDEQ protocol (sop#1134) and this QAPP.

Measurement Performance Criteria

The targeted criteria for measurement performance include accuracy, completeness, and comparability. Completeness of data must be over 80%, allowing for potential losses during sample collection, transport, or analysis.

Beyond sample loss, analytical results may suffer from introduced variability. The level of method variability will be assessed by analyzing method blanks with each sample set collected during a sampling event.

Accuracy will be measured using standard reference materials (SRM) in triplicate per sample set, for which recovery must be $100 \pm 10\%$ of their true value. Furthermore, accuracy and matrix interference will be determined by including matrix spike duplicate (MSD) samples per sample set analyzed. Target recovery of matrix spikes will be $100 \pm 30\%$, where recovery is calculated as:

$$\% \text{ Recovery} = \frac{SQ - NS \times 100}{\text{Spike}}$$

Where:

SQ = the concentration of the spiked compound measured in the routine or blank sample

NS = concentration of the target compound native to the unspiked routine or blank sample

Spike = the concentration of the target compound spiked in the routine or blank sample

Analytical precision will be measured using MSD samples from which the relative percentage difference (RPD) is calculated as:

$$RPD = \frac{(R1-R2)}{((R1+R2)/2)} \times 100$$

Where: RPD= Relative Percent Difference and
R1 and R2 are the initial and duplicate measurement values, respectively
Target precision will be 30% RPD.

A.8 Special Training/Certification

No certification is required of the investigators on this project. However, all personnel operating water quality monitoring equipment (including collection of samples), performing analyses or recording data will be trained and are required to demonstrate proficiency before working on this project. LDEQ will assist with proper installation of water quality monitoring equipment.

A.9 Documents and Records

The scientific integrity of this project and the conclusions drawn from its findings depend on adequate documentation of all activities, including sample collection, analysis, and data management. All activities will be performed in accordance with written protocols and standard operating procedures (SOPs). Key elements of project documentation and record keeping are listed below.

Field Operation Records

Sample Collection Records

Records will show that proper sampling protocols were performed in the field. This documentation will include the names of the persons conducting the activity, sample number, sample collection points, maps and diagrams, equipment/method used, climatic conditions, and unusual observations. Bound field notebooks will be used to record raw data and make references to prescribed procedures and changes in planned activities. These notebooks will be formatted to include pre-numbered pages with dates and signature lines.

Chain-of-custody records

Chain-of-custody forms (Appendix A) will be used to document the progression of samples as they are transported from the sampling site to the laboratory.

QC Sample Records

These records will document the generation of QC samples, such as blanks and duplicate samples. They will also include documentation on sample integrity and preservation and include calibration and standards' traceability documentation capable of providing a

reproducible reference point. Quality control sample records will also contain information on the frequency, conditions, level of standards, and instrument calibration history for both laboratory and field equipment. All instruments used in the field will be calibrated before use, and periodically afterwards, according to the manufacturer's recommendations and instructions.

Quarterly Reports

Quarterly progress reports will be prepared by the Principal Investigator and submitted to LDEQ through LSU AgCenter Grants and Contracts Office as required for invoicing. Quarterly reports will summarize project activities, significant observations, problems encountered and corrective actions taken.

Quality Reports

The Project QA Officer will prepare a comprehensive quality report summarizing the results of a project-wide quality audit within six months of EPA approval of this QAPP. Details on the method or preparation and content are provided in Section B of the QAPP. Quality reports will be submitted annually following the comprehensive quality report.

Data Handling Records

These records document protocols used in data reduction, verification, and validation. During data analysis, no "outliers" will be discarded unless scientifically valid justification is used. Notebook data will be transferred to computer and any processing (i.e., spreadsheet, graphics, and statistics) will be performed with results saved on a hard drive. In addition, data will be backed up to a network backup computer as new data is added. The results, negative and positive, of studies associated with this project will be discussed with the Project Manager and documented with quarterly reports that are submitted to the LDEQ Project Manager. The intended use of data collected in these studies is for publication in peer reviewed journals, for collaborative studies, and for decision-making.

Group B: Measurement And Data Acquisition

B.1 Sampling Process Design

The location of water quality monitoring stations and timing of sample collection is intended to demonstrate and quantify the benefits of a constructed wetland in reducing NPS losses in runoff from over 400 acres of agricultural land. *In situ* measurements and automatic water sampling will be conducted at the same location so that measurements from one will supplement the other. Water samples will be collected and *in situ* measurements taken at points where runoff enters the wetland, at the exit point of the shallow or first stage of the wetland, and at the exit point of the final stage of the wetland. These samples will be analyzed for nutrients, suspended solids, selected pesticides, and total and fecal coliform in a laboratory. The water quality of both sections of the wetland will be monitored for temperature changes, electrical conductivity, pH, and dissolved oxygen using a HYDROLAB®. All parameters and analytical methods are provided in Tables B.1.

The project will include approximately 24 months of water sampling and analysis. Following completion of wetland construction, water samples will be collected during rainfall events that result in runoff to determine dynamic changes in the quality of water as it travels through the system. To determine changes in water quality in the shallow and deep parts of the wetland in between runoff events, samples will be taken biweekly and analyzed.

Water quality and pesticide analysis

Measurement of basic water quality parameters will include temperature, pH, dissolved oxygen (DO), conductivity, and total suspended solids (TSS). Analysis of nutrient components will include total kjeldahl nitrogen (TKN), total phosphorous, nitrate, and orthophosphate. All water samples will be analyzed for the presence of two pesticides that have been associated with runoff from agricultural fields; atrazine [2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine] and metalochlor [4-amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(4H)-one]. Water samples will also be analyzed for the presence of total and fecal coliforms.

All nutrients and pesticides will be analyzed at the EPA-accredited Ana-Lab Laboratory in Kilgore, TX. Total and fecal coliforms will be determined at the Red River Research Station due to the 6-hour window required between sampling and analysis. Details of the analytical methods that will be used for each parameter are listed in Table B.1. Temperature, pH, DO, and conductivity will be determined *in situ* with a DataSonde 4A Multiprobe HYDROLAB® unit (Hydrolab Corp., Austin, TX).

Table B.1. Parameters and Methods for Water Quality and Pesticide Analyses

Parameter	Analysis Method	MDL	Preservation	Container (Bottles)	Storage Requirements/ Holding Times
TSS	EPA 160.2	1000 ppb	Unpreserved	Nalgene	4°C, 7 day
TKN	EPA 351.2	11.68 ppb	H ₂ SO ₄	Nalgene	4°C, 28 day
NO ₃ ⁻	EPA 300.0	5.123 ppb	Unpreserved	Nalgene	4°C, 2 day
TP	EPA 365.2		H ₂ SO ₄ to pH 2		4° C
PO ₄ ⁻	EPA 300.0	11.54 ppb	Unpreserved	Nalgene	4°C, 2 day
Coliform, Total	SM ₁₈ 9222B	5/100 ml	Unpreserved	Nalgene	4°C, 6 hours
Coliform, Fecal	SM ₁₈ 9222D	5/100 ml	Unpreserved	Nalgene	4°C, 6 hours
Metalochlor	EPA 619	To Be Established by Laboratory	Unpreserved	Amber glass	4°C, 7day
Atrazine	EPA 619	To Be Established by Laboratory	Unpreserved	Amber glass	4°C, 7day
pH (HYDROLAB®)	EPA 4500-H ⁺	0 Units	NA	<i>In situ</i>	NA
DO (HYDROLAB®)	EPA 4500-O	0 mg/L	NA	<i>In situ</i>	NA
Conductivity (HYDROLAB®)	EPA 2520-B	0 mS/cm	NA	<i>In situ</i>	NA
Temperature (HYDROLAB®)	EPA 2550	-5°C	NA	<i>In situ</i>	NA

Statistical Analysis

Statistical analysis of water quality parameters and pesticide levels will be performed using SAS® (SAS Institute, Inc., Cary, NC) by comparing sample means and standard errors within and between sampling events using analysis of variance followed by Fisher's least significant difference test.

B.1.2. Scheduled Project and Measurement Activities

Sampling events will be scheduled to coincide with rain events that result in runoff or at least once monthly.

B.1.3. Rationale for Design

The design will determine the effectiveness of a constructed wetland in improving water quality of runoff from agricultural fields.

B.2 Sampling Methods

Sample Collection

Automatic water sampling stations will be located at four points as shown in Figures A.6.1 and A.6.2. Each sampler will use an area velocity flow meter to monitor flow and collect flow-weighted composite water samples. Two will be located near two ditches that drain runoff from the 400 acres before entering the constructed wetland system. These two locations were chosen because these ditches transport the majority of runoff from the row-crop area of the 400 acres. Samples from this location will be analyzed to determine the quality of water entering the constructed wetland system. A sampling station will be located on the levee separating the shallow and deep wetland. This station will sample water in the shallow wetland to determine improvements in water quality at this stage of the constructed wetland system. A sampling station will also be located at the levee that separates the deep wetland from its point of egress. This station will collect water samples from the deep wetland to determine improvements of the quality of water at the final stage of the constructed wetland system. Water samples will be collected for 2 years to determine the effectiveness of the constructed wetland system in improving the quality of water of runoff from over 400 acres of agricultural land. Samples will be collected when sufficient rainfall occurs to result in runoff from the 400 acres into the system and outflow from both wetland cells (i.e. when sufficient water has accumulated in both the shallow and deep wetland cells to result in outflow through the culverts of both). Intermittent samples will be collected using a Van Dorn sampler from the shallow and deep wetlands to monitor changes in water quality between rainfall events. The locations for collecting these samples will be marked and all samples will be taken from approximately the same location each time samples are collected. Samples will be collected in accordance with the Louisiana Department of Environmental Quality's Standard Operating Procedure (SOP) For Water Sample Collection, Preservation, Documentation and Shipping, Revision 3.

Sample Identification

For chemical analysis, each sample will be identified by a unique laboratory sample number assigned to each sampling location and event. A single sample number will be used for all parameters analyzed from the same sample. Sample numbers will be assigned and sample containers labeled with these numbers prior to use. Sample labels will also include information about the sampling location, sampling date, project number, sample matrix, requested analytical parameters, and preservation information.

B.3 Sample Handling and Custody

Sample preservation and delivery

Sample preservation in the field will consist of placing the samples on ice in an insulated cooler and transporting to the laboratory located approximately 3700 feet from the wetland site. In the laboratory, samples will be divided and placed in separate containers that contain preservation chemicals specific for the analysis to be conducted. Samples will be stored and analyzed as specified in Table B.1. A field sheet will be completed for each day of sampling. The field sheet

will be delivered to the lab along with the samples. Upon arrival at the lab, the following will be checked:

- Correct use of sample ID and agreement of the sample ID with the field sheet (Appendix B).
- Appropriate sample bottles and sample preservation have been employed
- Samples have been received within the hold time

When applicable, the following will also be documented:

- Any applicable or unique safety hazards of the sample
- Subcontracted parameters are included in the requested suite of analytes

At each sampling location, the following will be recorded on waterproof field notes

- Date and time of sample collection
- Sampling personnel
- Station location information
- Weather conditions
- Number and type of samples collected
- Any unusual ambient conditions
- Any deviations from standard sampling procedures

B.4 Analytical Methods

Samples will be analyzed using the appropriate analytical procedures and detection limits at an EPA-accredited laboratory, Ana-Lab Corporation, Kilgore, TX (Table B.1). Because of the short holding time, coliform analysis will be conducted in a laboratory located at the Red River Research Station 5 minutes from the constructed wetland site.

B.5 Quality Control

Field and laboratory quality control procedures

Quarterly field duplicate samples will be collected to determine variability in sampling procedures for nutrients and pesticides. In addition, quarterly field blanks, using deionized water, will be analyzed to estimate the potential for sample contamination due to field procedures. For laboratory quality control procedures, the contract laboratory is accredited by the American Association for Laboratory Accreditation to ISO Guide 25, the ISO 9002 implementation for analytical laboratories. The lab participates in performance and system audits that serve to verify the adequacy of laboratory SOPs that include preventative maintenance and data reduction procedures. For samples performed at the contract laboratory, the frequency of quality control samples to be performed for this project include method blanks, standard reference material, spike blanks, surrogate recovery, lab duplicates, matrix spikes, and matrix spike duplicates.

Data entry

The data entry process involves three levels of quality control:

- pre-data entry checking
- computer-based data entry forms with error screening
- post-data entry checking

Pre-data entry checking is conducted by the PI who:

- Assigns unique route and observer identifier codes if needed
- Checks all forms and summary sheets to ensure all required materials have been submitted
- Generally ensures all forms are ready for the data entry phase

All data will be entered and stored in a database program (e.g. Excel® or SAS®). Data entry will be facilitated by customized data entry forms (computer screens) appropriate to each of the project's summary sheets (water quality measurements, pesticide values).

The post-data entry checking phase will be conducted after all project data have been entered into the database. For this phase of quality control, staff will identify and correct all typographical errors made during the process of data entry and ensure that all entered data matches that reported in the data forms and summary sheets. Discrepancies will be identified and corrections will be made immediately.

B.6 Instrument/Equipment Testing, Inspection, and Maintenance

The equipment used in this demonstration project will be in excellent working condition. All equipment will be inspected, tested, and maintained to assure readiness to collect accurate data. Technicians will consult with the operation manuals for all equipment to assure that each checklist item is addressed both for inspection, testing, and maintenance. Preventative maintenance will be performed on all instruments to promote timely and effective completion of measurements.

B.7 Instrument/Equipment Calibration and Frequency

All instruments used for data collection activities will be calibrated to maintain performance within specified limits according to the manufacturer's specifications. Trained technicians will perform and document this activity in log books.

B.8. Inspection/Acceptance Requirements for Supplies and Consumables

All materials supplied by vendors will be inspected by project staff upon their arrival. Handling and storage conditions for supplies and consumables, if appropriate, will be documented in an equipment check-list.

B.9 Non-direct Measurements

USDA-NRCS engineers measured elevation in the area previously chosen as the ideal site for the constructed wetland. These measurements, in combination with historical rainfall records, were used to design the constructed wetland to accommodate all runoff. USGS DOQQs and topographical maps have also been used in determining the best location for the constructed wetland.

B.10 Data Management

The PIs will organize all forms, enter data in the computer, and implement the quality control measures outlined above (B.5). The PIs will sign off on each form or report following the data entry associated with the control steps. All data will be stored in computer files with appropriate backups. Data analysis will be conducted using SAS® statistical software.

Group C: Assessment/Oversight

C.1 Assessments and Response Actions

The LDEQ staff will visit each monitoring location to observe water quality/quantity measurements. Equipment operation will be demonstrated to verify proper operation. After initial approval of field equipment and operations by LDEQ, the LSU Project QA Officer will visit field locations at least quarterly to verify continued proper operation of the field component. Visits will include audit of field logbook as well as equipment operation. If inspections/audits reveal discrepancies with SOPs, these will be immediately corrected and reported to the Project Manager. Thereafter, the Principal Investigator will report field monitoring and laboratory analytical activities/progress to the Project Manager on a prescribed schedule until the latter is satisfied that the project is being successfully implemented.

C.2 Reports to Management

Quarterly reports documenting all project activities and results will be submitted to the LDEQ Project Manager. Reports will include a summary of project progress, assessments of data quality objectives, and a description of problems encountered and corrective actions taken. Annual reports will be prepared summarizing all project activities for the previous calendar year. These reports will give a current overview and summary of all project activities, progress and findings since the start date. Previously submitted deliverables may be referenced rather than submitted with the annual report. Upon completion of the project, a draft final report will be developed and submitted to LDEQ and EPA for review. The report will include all data and activities of the project. It will give a detailed account of all activities, results, findings, and recommendations of the project. Upon incorporation of LDEQ and EPA revisions to the draft final report, triplicate copies of the final report and all deliverables will be submitted to LDEQ.

It is anticipated that this project will result in several manuscripts for publication in scientific, peer-reviewed journals. In addition, results will be presented at regional and national scientific meetings in the form of poster or platform (oral) presentations.

Group D: Data Validation And Usability

D.1 Data Review, Verification, and Validation

All project data will be reviewed by the PIs and Project Manager to determine if they meet data quality objectives. Decisions to reject or qualify data will be made by the PIs.

Several of the data validation criteria involve specific calculations. Examples are presented below.

Instrument Response Linearity (Calibration)

Acceptance criteria for instrument response linearity are based on the correlation coefficient, r , of the best-fit line for calibration data points. The coefficient reflects the linearity of response to the calibration standards and is calculated by,

$$r = \frac{\sum (Xi - \bar{X})(Yi - \bar{Y})}{\sqrt{\left(\frac{\sum (Xi - \bar{X})^2}{n-1} \right) \left(\frac{\sum (Yi - \bar{Y})^2}{n-1} \right)}}$$

where \bar{X} and \bar{Y} are means of the independent and dependent variables, X_i is one value of the independent variable, Y_i is one value of the dependent variable and n is the number of observations.

Precision

Control limits for sample analyses, acceptability limits for replicate analyses and response factor agreement criteria specified in the calibration and internal QC checks are based on precision in terms of the coefficient of variation, CV, or relative percent difference, RPD.

$$CV = \left(\frac{S}{\bar{Y}} \right) \times 100$$

where S is the standard deviation,

$$S = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}}$$

The RPD allows for comparison of two values of an analysis in terms of the precision with no estimate of the accuracy.

$$RPD = \frac{|Y_1 - Y_2|}{\left(\frac{|Y_1 + Y_2|}{2} \right)} \times 100\%$$

where the subscripts refer to the first and second of two determinations.

For duplicate measurements, CV is related to RPD by the following:

$$CV = \frac{RPD}{\sqrt{2}}$$

Accuracy

The accuracy of data is typically summarized in terms of the relative error, RE. This statistic reflects the extent of agreement, as a percentage, of the measured value with the true value of SRM.

$$\% \text{ Relative Error (RE)} = \frac{\text{Measured Value} - \text{Actual Value}}{\text{Actual Value}} \times 100$$

This expression of accuracy allow for comparison of accuracy across a range of different values (e.g., concentrations) and for different parameters of the same type (e.g., different chemical species analyzed by the same method). Control sample analysis will be evaluated by RE.

Similarly, percent recovery, PR, will be calculated.

$$\% \text{ Recovery (PR)} = \frac{\text{Measured Value}}{\text{Actual Value}} \times 100$$

The QC program includes blank and matrix spikes. Percent spike recovery, PSR, will be calculated on these QC samples.

$$\% \text{ Spike Recovery (PSR)} = \frac{(\text{Value of Sample Plus Spike}) - (\text{Value of Unspiked Sample})}{(\text{Value of Spike Added})} \times 100$$

Control Limits

Control limits for central tendency and variability are generated in the laboratory to statistically monitor performance. These limits are within method-specified tolerance.

Since control limits may improve as the analytical systems are improved, these limits are not provided here. Instrument-specific documentation such as operating manuals may be consulted for initial baselines, especially for blank and duplicate analyses, however, project-specific control limits will be determined as more data are collected and will be given in QA reports, along with project reports.

Blank Data Assessment

Reagent blanks indicate whether contamination exists due to laboratory sources (reagents, glassware and instruments). The most common contaminants introduced in a laboratory are low molecular weight organics including methylene chloride, acetone and toluene. These are ubiquitous in laboratories and minimizing contamination with them is part of standard laboratory procedures. However, these chemical species are not parameters measured in this project, and therefore are of no concern. Results of other types of blanks, including equipment blanks, are assessed individually. Should contamination be found, its source will be identified and any samples affected will be flagged.

Completeness

Completeness is calculated after the QC data have been reviewed. Besides excluding samples that lie outside QC limits for a method, samples may be lost due to spillage, contamination or other causes. The percentage of valid results is reported as completeness, defined for this project as,

$$\text{Completeness} = \frac{T - (I + NC)}{T} \times 100\%$$

where T is the total number of unknown samples for which a parameter was to be determined, I is the number of invalidated sample measurements, and NC is the number of sample measurements that were never made because of spillage and the like.

D.2 Verification and Validation Methods

As described above (B.5), all data are validated on a quarterly basis against the summary sheets and field forms submitted by the project participants. Data from the summary sheets will only be revised if other submitted materials (i.e., field survey forms) allow an unambiguous identification and correction of errors. All data will be reviewed routinely for abnormalities, inconsistencies, or unusual results. If any of these occur, the data will be traced back through laboratory records and field record books to look for possible causes of the error. In the event that no error is found, the data will be assumed to be normal and appropriate for use in project reports and in decision making. If an error is found and no resolution can be arrived at concerning its source or cause, the data will be flagged. Results will only be discarded if an error is identified. Results will be presented with full description of quality control concerns. Dr. Millhollon will retain authority to discard data found questionable. Data from field duplicates will be analyzed by comparing the measured range to the laboratory quality control value for each parameter. In the event the range exceeds the laboratory control value, the laboratory will be notified to check for errors. If no error can be identified and corrected, the data for that parameter from all sites for that date will be flagged. Data will only be discarded upon clear evidence of an error. If questions arise concerning chain of custody, these items will be flagged in the project report. A description of the incident and resolution will be documented in all reports.

D.3 Reconciliation with User Requirements

Periodic reporting of project data require that analyses be performed which address one or more of the program's objectives. Data quality will be assessed with respect to the specific analysis and reporting planned. For example, data of sufficient quantity and precision is necessary for statistically differentiating a reduction in nutrients and pesticides resulting from the constructed wetland. For a given set of analyses, data will be removed from consideration only for the reasons described previously (B.5, D.2) or for other pertinent and scientifically defensible reasons.

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CHAIN OF CUSTODY FORM

 ANA-LAB CORP. <small>THE COMPLETE SERVICE LAB</small>		2600 Dudley Road P. O. Box 9000 Kilgore, Texas 75663 Phone: 903-984-0551 Fax: 903-984-5914 Email: corp@ana-lab.com		CHAIN OF CUSTODY		Amarillo, TX 806-355-3556 Crofton, MD 410-721-6506		Arlington, TX 817-261-6404 Nassau Bay, TX 281-333-9414		Austin, TX 512-821-0045 Norman, OK 405-292-6630		Brownsville, TX 956-831-6437 Shreveport, LA 318-219-9300				
		Report to:				Project - name/location				Analysis Requested						
		Company name:				Billing Address (if different)										
		Address:														
City		State		Zip		City		State		Zip						
Phone		Fax		Phone		Fax										
Sampler Signature			Printed Name			Affiliation			PO Number							
Lab Number Do Not Use		Field Identification		Date	Time	Matrix	# of Containers	Notes								
Date	Time	Relinquished by:					Received by:			<input type="checkbox"/> Wastewater <input type="checkbox"/> Drinking Water <input type="checkbox"/> SW346 Samples contain <input type="checkbox"/> HF <input type="checkbox"/> CN <input type="checkbox"/> S= <input type="checkbox"/> other##						
		Printed Name					Signature					Affiliation				

Samples Received on Ice? <input type="checkbox"/> Yes <input type="checkbox"/> No Cooler/Sample Secure? <input type="checkbox"/> Yes <input type="checkbox"/> No Requested TAT <input type="checkbox"/> Routine <input type="checkbox"/> 3 day	Method of Shipment <input type="checkbox"/> Bus <input type="checkbox"/> FedEX <input type="checkbox"/> Lone Star <input type="checkbox"/> UPS <input type="checkbox"/> Hand delivered <input type="checkbox"/> Airborne <input type="checkbox"/> other Tracking or Shipping Number <input type="checkbox"/> 2 Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 2-8 Hour	Samples contain HF CN	##comments
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PROJECT NAME: CONSTRUCTED WETLANDS TO IMPROVE WATER QUALITY FOR WHOLE-FARM OPERATIONS

COMMENTS:

APPENDIX F - Geographical Information Systems (GIS)

Data Requirements

Acceptable Digital Formats

There is a definite need to ensure basic consistency concerning the data entered and used in GIS. GIS data developed for EPA and LDEQ must be easily transferable to the LDEQ GIS database, to EPA, and to other stakeholders. Therefore, all Section 319 funded projects that contain a GIS component shall adhere to EPA and LDEQ required standards. The following statement will be included in such projects, and resultant products shall conform to the statement:

“All geospatial data created for LDEQ will be consistent with Federal Geographic Data Committee (FGDC) endorsed standards. Digital coverages/products will be compatible with ArcInfo software, and preferably be delivered as ArcInfo export coverages or ArcView shapefiles, with associated HTML containing metadata.”

The following web sites provide information to assist the sponsoring cooperator in meeting the above requirements:

1. Federal Geographic Data Committee Standards
www.fgdc.gov/publications/publications.html
2. National Map Accuracy Standards
<http://rockyweb.cr.usgs.gov/nmpstds.html>
3. Tools Available for Metadata Documentation: SMSS Commercial Project
www.enabletech.com/html/smms.htm
4. Tools Available for Metadata Documentation: ArcView Metadata Collector
www.csc.noaa.gov/metadata/text/download.html

Acceptable Map Projections

Various map projections are acceptable for various purposes. Projections must be in North American Datum (NAD) 83. Additionally, a map or digital set in a geographical reference system (available as a projection option in ArcInfo and ArcView) is preferred.

1. Geographical Reference System. Units shall be in decimal degrees with additional fields containing degrees, minutes, seconds as following: DD MM SS.SS
2. Universal Transverse Mercator. Units shall be in meters and in Zone 15. Activities within Zone 16 shall be re-projected into Zone 15. Additional fields shall include the locations projected to decimal degrees.
3. Albers Conic Equal Area. Units shall be in feet. 1st standard parallel 29° 32' 30.00"; 2nd standard parallel 32° 18' 30.00"; Central Meridian -91° 34' 00.00"; Latitude of projection origin 30° 55' 30.00"; Clark Ellipsoid 1866 for NAD27, WGS84 for NAD83.

Acceptable Locational Accuracy

Locational information acquired using Global Positioning System (GPS) equipment shall meet Map Accuracy Standards of 3 meters or less.

APPENDIX G - 319 Project Success Stories

The following appendix contains examples of successful projects that utilized 319 grant funds. Successful projects were defined as those that have achieved documented water quality improvements. Water quality improvements are demonstrated through the achievement of water quality standards for one or more pollutants/uses; nonpoint source total maximum daily load allocations (and removal from the state's section 303(d) list of impaired waters); measurable, in-stream reduction in a pollutant; or improvement in a parameter that indicates stream health (e.g., increases in fish or macroinvertebrate counts). Stories also demonstrate innovative strategies used to reduce nonpoint source pollution, the growth of partnerships, and diversity of funding sources. For a complete listing of the Section 319 Success Stories, see the EPA website below.

<http://www.epa.gov/owow/nps/Success319/index.htm>

Navesink River Shellfish Beds Upgraded

On January 1, 1997, the Navesink River was approved for unrestricted shellfish harvesting for the first time in 25 years. Water quality in the Navesink River has improved significantly as a result of a major interagency initiative involving federal, state, and county governments, private institutions (representing the environment, health, and agriculture), and the general public. The Navesink flows through Monmouth County, New Jersey, near the Atlantic coast.

The primary goal of this initiative, which has been underway for several years in the Navesink River watershed, is to reduce nonpoint sources of pollution sufficiently to reopen the river to unrestricted shellfish harvesting. Harvesting in the Navesink has been restricted since 1971.

A comprehensive, coordinated management plan was implemented in 1987 to reduce bacterial loadings to the estuary and restore recreational and commercial shellfish harvesting. At that time, a Memorandum Of Understanding was signed by the New Jersey Department of Environmental Protection (NJDEP), the New Jersey Department of Agriculture, U.S. EPA, and the USDA Natural Resource Conservation Service. It was also endorsed by 12 county, municipal, academic, and private organizations. The agreement formalized each one's commitment to the Navesink River Watershed Management Program and its goals. The water quality improvements in the Navesink are a direct result of successful nonpoint source pollution controls implemented by these partnerships over many years.

In the 1980s, the New Jersey Department of Environmental Protection's Environment Planning Program initiated the Navesink nonpoint source study, which included intensive watershed/land-use analysis, inventory and compliance assessment of point source permits, evaluation of potential nonpoint sources and monitoring of the estuary and its tributaries. Sources of contamination were subsequently attributed to a combination of stormwater runoff associated with residential development, agricultural waste, and marina/boat associated pollutants.

Over the last 10 years the NJDEP (Land Use Regulation, Shellfisheries and Marine Water Classification and Analysis programs) successfully carried out a joint project review strategy to "red-flag" coastal development applications (Coastal Area Facilities Review Act and Waterfront Development permits) for individual docks, marinas, and multiunit development projects in the Navesink watershed. Proposed projects considered for approval were scrutinized to assure that

nonpoint source best management practices (BMPs) were incorporated in the design plan. The NJDEP also designated the Navesink a "Special Water Area" in the Rules on Coastal Zone Management (N.J.A.C. 7:7E-3.1), which provides an additional measure of protection.

Many innovative measures were implemented to control nonpoint source pollution in the Navesink watershed:

- construction of a manure composting facility with federal and county funds to reduce animal waste runoff. Manure is removed from the waste stream through composting
- comprehensive stormwater controls as part of coastal permits; project applications in the coastal zone portion of the Navesink watershed were not approved for permits unless adequate stormwater management controls were part of the plan
- installation of berms and concrete pads to redirect manure and contaminated runoff away from tributaries that drain to the Navesink
- initiation of a citizen monitoring program
- formation of the Navesink Municipalities Association and the Navesink Environmental League, which meet monthly to represent local government and citizen stakeholder interests in the watershed
- state and federal funding for public education on ways to reduce nonpoint source pollution in the watershed, including hiring a public outreach coordinator; completing a 30-minute film documentary, *Navesink the Restoration of a River*, that aired periodically on PBS television; a quarterly newsletter, *Navesink News*; and a Navesink watershed worldwide Web page on the Internet
- state funding for a free public boat pumpout facility, which led the way to other pumpout facilities and a pending application to EPA for a "No Discharge Zone" in the Navesink River
- development of subwatershed approach to environmental planning, monitoring, and implementation of BMPs

There was an upgrade in classification for 623 acres of waters east of the Oceanic Bridge that allowed shellfish to be harvested every year from November through April without need for purification. A total of nearly 4,800 acres were upgraded in the shellfish reclassification as a result of improvement in overall water quality, bringing the total harvesting acreage to over 580,000.

Montana Surveys Knowledge of Forestry Education

The public/private partnerships that evolved from the forestry best management practice education effort have led to many small successes across Montana. Those small successes will breed major victories for water quality protection in the state.

A recent experiment under Montana's forestry education program has proven that its section 319-funded public awareness and education efforts are working. Since 1989, Montana has concentrated its voluntary forestry BMP education program on presenting workshops for loggers and landowners, developing printed literature, and distributing literature to thousands of loggers, landowners, and professional land managers.

In 1991, Montana decided to determine if a new BMP education campaign could make a measurable difference in knowledge among its target audiences. A new 34-page, full-color

forestry BMP booklet--written by Bob Logan, a Montana State University Extension forester, and Bud Clinch, a Department of State Lands commissioner-- provided the material.

The experiment had two major objectives--to measure user knowledge before the booklet's release and to measure knowledge 12 months later. In 1991, a direct mail questionnaire was sent to 550 randomly selected potential respondents--timber fallers, forest landowners, dozer/skidder operators, road builders, logging contractors, and foresters. The survey document contained 38 true-false and multiple-choice questions covering such subjects as stream crossings and their effect on water quality, streamside management and timber harvesting BMPs, hazardous materials, forest roads, and other forest activities.

All those who completed the questionnaire received the BMP booklet by return mail. Approximately 12 months later, the same questionnaire was sent to all who responded to the 1991 mailing. The return rate on the 1991 questionnaire was 36 percent. The return rate for the second questionnaire from those who had previously - responded and had received the booklet was 53 percent.

Scores of all six audiences responding to the second questionnaire showed improvement. Forest landowners showed the largest increase in knowledge--with test scores increasing by 9 percent. Road builders and timber fallers increased 5 percent, with logging contractors and dozer/skidder operators increasing by 4 percent. Knowledge of stream crossings increased the greatest of all subject areas--by 20 percent. Prior to this experiment, the prevailing attitudes to Montana's voluntary BMP education program were "Don't tell me what to do," "I know all there is to know about BMPs," and "BMPs are just a matter of common sense." However, the 1992 questionnaire indicated a dramatic change in attitude among respondents. For example, when asked about the need for increasing attention to forestry BMPs, the average respondent leaned heavily toward the opinion that this information was long overdue.

Montana's voluntary forestry BMP education program, using \$86,430 in section 319 funds, appears to be working. On-the-ground audits of forest harvest sites, conducted regularly by the Department of State Lands Forestry - Division, show that in addition to increasing the knowledge of critical audiences in subjects important to water quality protection, application of that knowledge in the forest has dramatically improved.

Saving Michigan's Blue Ribbon Trout Stream

In 1992, the Grand Traverse Soil Conservation District received a section 319 grant to treat streambanks and road crossings that were contributing sediment to the Boardman River, a 295-square-mile blue ribbon trout stream located in northwest lower Michigan. To ensure that the diversity of river users would be honored, the District developed a steering committee that topped 200 members, including local townships, numerous state and county agencies, communications companies, utilities, recreational groups, a regional land conservancy, construction companies, and other businesses.

Working together for almost four years, these partners stabilized 96 sites on the Boardman River and, as a result, prevented over 1,200 tons of sand from entering the system each year. To maximize resources, the District worked with the Michigan Department of Corrections to obtain prison labor for the project. They also used numerous bioengineering practices to further stretch their 319 funding. Bioengineering practices used included:

- transferring native plants from elsewhere in the watershed to the site needing vegetation,
- using whole tree revetments at the toe of some slopes,
- using log cribbing to terrace a steep slope,
- bringing vegetation to near the water's edge, and
- planting vegetation with rock riprap.

These practices stabilized the sites at a lower cost than traditional rock structures and helped blend the new sites into the surrounding landscape. Other practices also proved useful in the Boardman River. For example, working with fisheries managers, the District added fish lunkers to several of the sites to help provide habitat for trout. The wooden lunkers were installed at the toe of a bank, covered over with rock and topsoil, then seeded. Amazingly, the sites with lunkers look no different than sites without lunkers.

As a final example, using composted leaves became a regular practice for the District. The leaves were donated by Traverse City and mixed into the soil prior to seeding or hand planting vegetation. This practice has been especially helpful on south-facing sandy slopes where it is usually difficult to get vegetation to grow.

Having addressed the primary sources of sediment in the watershed, the District installed and developed long-term agreements with individuals and groups to maintain four sand traps, each of which, when cleaned, will remove an additional 1,000 tons of sand from the river.

To promote the watershed restoration efforts, the District also developed an information/education campaign that included watershed brochures, a project display, T-shirts, an educational video, and three 30-second public service announcements (PSAs). The educational video, entitled "Currents of the Boardman," was filmed and produced by a local utility company, MichCon, which also filmed and produced the PSAs. The PSAs have been aired over 1,000 times on local television.

League of Women Voters Guides Extensive Urban NPS Campaign

"Crystal clear" and "sparkling blue" are common media references to Colorado's waters. Citizens throughout the state have been hearing another water message, though, through a special outreach crusade. The message shares how an average homeowner can actively protect and avoid polluting Colorado's waters.

The League of Women Voters' Colorado Education Fund is reaching the state with this message through the Colorado Water Protection Project, supported in part through 319 funding. The project seeks to raise citizens' awareness of the need for more preventative approaches for emerging water issues. Because most of Colorado's population is urban, three information areas were identified for emphasis: home fertilizer and pesticide use, pet waste, and do-it-yourself auto maintenance.

The media campaign kicked off with a 30-second television message that aired statewide for a 10-day period in spring 1999. About 90 percent of potential Colorado viewers were reached with the television products. The campaign was broadened with the concurrent release of information through newspaper articles, eye-catching local bus advertisements, and pollution prevention pamphlets that were distributed statewide. Project partners include a diverse

representation of private and government entities. Nearly 40 representatives serve on the project's technical committee, and 16 organizations have contributed funds and services.

Surveys conducted before implementing the project found that less than 50 percent of the respondents knew that storm water runs into local rivers, streams, and lakes untreated by municipal treatment facilities. A majority did not realize household-generated polluted runoff was a significant contributor to water pollution. More than 25 percent did not think household-generated polluted runoff was a local community concern or had an impact on their quality of life. Twenty percent did not think a person could make a difference by preventing pollution in his or her household.

Lack of information and inconvenience were noted as barriers to changing behavior. Television and newspapers were found to be best means to convey needed information. Health concerns, drinking water protection, and environmental quality for future generations were the main motivation factors for changing behavior.

Post-project survey results showed that respondents have been affected by the project's efforts. Two project goals were met—greater awareness of what household-generated polluted runoff is and increased understanding that individuals can make a difference. Less success was realized in meeting the goal of increasing people's understanding of how polluted runoff enters local rivers, lakes, and streams.

Rhode Island's Soil-Erosion Control Ordinance

Rhode Island has identified and targeted runoff as one of the major contributors to poor water quality throughout the state. As such, its goal is to control soil erosion and stormwater runoff through efforts like the soil-erosion control ordinance.

In targeting runoff in its Nonpoint Source Assessment and Management Plan, Rhode Island decided to help communities prevent and control water quality impacts from soil erosion and stormwater runoff, particularly from new construction activities. Using section 319 funds, the Rhode Island Department of Environmental Management's (RIDEM) NPS Pollution Management Program developed a model ordinance and self-supporting technical assistance program over three years to address this issue. In 1989, a multidisciplinary task force began work on legislation to allow communities to adopt a soil erosion control ordinance. The ordinance was prepared by the RIDEM NPS Program, with guidance from the task force, and was adopted by the state general assembly during the 1990 session. The legislation gives communities the authority to adopt a soil erosion ordinance. The task force also developed consistent guidelines and conducted peer reviews for best management practices to control soil erosion and stormwater runoff.

In 1990 and 1991, the Rhode Island conservation districts used section 319 funds to hire a full-time engineer. The engineer provided technical assistance to communities by consulting with community officials and builders, reviewing soil erosion and stormwater runoff plans, and making site visits before, during, and after construction. The district engineer also advised communities and builders when other environmental regulatory approval from federal and state programs would be needed.

The district engineer has visited all communities at least once to meet and educate local officials about the need to adopt the ordinance. The conservation districts also hold a yearly training

program for municipal officials and private consultants on how to develop and implement soil erosion and stormwater runoff plans.

Initially, the conservation districts used approximately \$130,000 of section 319 funds for seed money to pay the initial salary for a district engineer, while developing a fee structure for localities to pay for the technical assistance. As of 1993, the conservation districts had established cooperative agreements with 20 of Rhode Island's 39 cities and towns, enabling the financially self-sufficient program to provide necessary and beneficial technical services throughout the state. Although the localities have no way to quantify specific water quality improvements, they believe that their water quality has improved as a result of this program.

APPENDIX H – Example Scopes of Services

The following Attachments are Scopes of Services for currently and previously funded LDEQ 319 projects. Upon approval of the workplan by EPA, LDEQ Nonpoint Project Managers will work with the cooperator to compile a Scope of Services for each project.

Prospective contractors should use the following samples as a guideline for the type of projects, as well as the content that LDEQ is seeking in proposals. Proposals should be organized and compiled according to the format instructions in the RFP text and Appendix B; however, many of the proposal's components, such as tasks and deliverables should be modeled after the examples in the following Scopes.

Constructed Wetlands to Improve Water Quality for Whole-Farm Operations

Introduction

Over 25,000 acres of agricultural cropland and 29,000 acres of pastureland reside within LDEQ's water quality sub-segments 100402 and 100406 (LDEQ, 2000). The Flat River and Red Chute Bayou drain these segments and, based on the 2000 Water Quality Inventory 305(b) Report, these two water bodies only partially meet their designated uses. The Flat River/Red Chute Bayou watershed is on the 1999 court-ordered 303(d) list of impaired waters in Louisiana. The primary suspected causes of this impairment are organic enrichment, low dissolved oxygen, nutrients, pesticides, suspended solids, siltation, and pathogen indicators resulting from non-irrigated crop production.

Although agricultural practices such as conservation tillage help reduce non-point source discharges, they are only partially effective. However, limited information indicates that constructed wetlands have been used successfully for the treatment of non-point discharges from agricultural sources, removing 90 percent of total phosphorous and suspended solids, 80 percent of chlorpyrifos and metolachlor, and 50 percent of atrazine (DuPoldt *et al.*, 1993¹ and M. T. Moore, 1999²). Constructed wetlands remove sediment through physical means and pesticides and fertilizer through biological means provided by plants and microorganisms.

The LSU AgCenter's Red River Research Station consists of 573 acres of agricultural land located in the Red River Basin. Run-off water from the station drains into the Flat River, which is located less than one-third mile away. Approximately 400 acres of discharge water from the station flows to the southeastern corner where it enters Lay's Bayou and flows to Flat River. The southeast corner of the station is therefore an ideal location to construct a wetland to demonstrate the potential for improving the water quality of discharge from agricultural lands prior to drainage into state water bodies.

Specific Goals and Objectives

The specific goal of this project is to demonstrate the potential of a constructed wetland for improving the quality of water discharged from over 400 acres of agricultural land in the Red River Basin by reducing nutrients, sediments, and pesticides entering Flat River. The objectives of this project are:

1. With the guidance of engineers from the NRCS, construct a wetland in the Red River Basin that will accommodate discharge from 400 acres of agricultural land.
2. To determine the efficacy of a constructed wetland in improving water quality of agricultural discharge prior to entering an impaired water body.
3. Develop and implement an educational outreach program to inform agricultural producers of the benefits that can be derived from the construction of a wetland.

¹ Dupoldt, C.A., R.W. Franzen, C.R. Terrell, and R.J. Wengrzynek. 1993. "Nutrient and Sediment Control System." Chester, PA: Environmental Quality Technical Note No. N4, USDA-SCS, NNTC. 19 pp.

² Moore, M. T. 1999. Fate of Chlorpyrifos, Atrazine, and Metolachlor from Non-point Sources in Wetland Mesocosms. A Dissertation presented for the Doctor of Philosophy Degree, University of Mississippi, Oxford, MS.

Project Element I: QAPP Development Requirement

All work funded by this contract involving the acquisition of environmental data generated from direct measurement activities, collected from other sources, or compiled from computerized data bases and information systems shall be implemented in accordance with an approved Quality Assurance Project Plan (QAPP). The QAPP will be developed using a systematic planning process. It will document a concise and complete plan for the environmental data operation and its quality objectives and will identify key project personnel. Any costs for data generation or environmental measurements incurred prior to approval of the original QAPP will be ineligible for reimbursement under this contract.

Task 1.1: Develop draft QAPP for approval: The QAPP will describe the project management and the collection, analysis, evaluation, and reporting of all data collected during the project. The document will be developed according to EPA requirements for QAPPs (EPA QA/R-5) and guidance for QAPPs (EPA QA/G-5) and will address each element of the project. EPA QA/R-5 and QA/G-5 can be found at:

http://www.epa.gov/quality/ga_docs.html#EPArqts.

The contractor is responsible for maintaining an electronic version of the QAPP in Microsoft (MS) Word.

None of the environmental work addressed by the QAPP shall be started until the QAPP has been approved and distributed to project personnel.

The contractor shall ensure that the QAPP is implemented and that all personnel involved in the work have direct access to and understanding of the QAPP and all other necessary planning, implementation, and assessment documents. These personnel should understand the requirements prior to the start of data generation activities.

Equipment Purchases:

Equipment funded through this contract, including but not limited to equipment used for sample collection or analysis, may not be purchased before approval of the QAPP and/or without prior express written approval from LDEQ.

Deliverable: Approvable QAPP.

Federal Payment: \$17,500

Federal payment for the QAPP will be issued as follows:

25% upon submission of draft QAPP

75% after the QAPP is approved.

Schedule: Months 1-3

Task 1.2: QAPP Reviews and Revisions: The contractor shall, at a minimum, conduct annual reviews of the QAPP and revise as needed. (More frequent review and revision may be necessary.) The contractor is responsible for initiating the annual review of the QAPP prior to the expiration date. The expiration date is one year after the latest date of an EPA signature.

Sixty (60) days prior to the expiration of the QAPP the contractor will submit to LDEQ a new signature page with current dates if the annual review reveals that a revision is not needed. Results of the review shall be documented on the Review and Revision Record of the QAPP.

Ninety (90) days prior to the expiration of the QAPP the contractor will submit to LDEQ a draft revised QAPP if the annual review reveals that a revision is needed. Results of the review and all proposed revisions shall be documented on the Review and Revision Record of the QAPP.

Deliverable: Annual QAPP reviews.

Federal Payment: \$5,000

Federal payment for annual QAPP reviews will be issued upon approval of the final report.

Schedule: Months 1 - 36

Project Element II: Implementation of a Strategy to Improve Water Quality With a Constructed Wetland.

Identify a suitable location that utilizes natural flow to collect runoff from approximately 400 acres of land in the Flat River/Red Chute Bayou watershed of Northwest Louisiana to construct a wetland. Once the suitable location is identified, the wetland will be constructed as designed by NRCS personnel. Best Management Practices will be included in the design and construction of the wetland.

Task 2.1: Create a detailed land use map of the targeted sub-watershed using satellite/aerial images. Map base data layers will include, but are not limited to, Digital Elevation Models (DEM), Digital Ortho Quarter Quadrangles (DOQQ), Digital Raster Graphics (DRG-7.5' Topographic Quadrangle), Digital Line Graphs (DLG-Hydrography) and available satellite imagery. DEM, DOQQ, DRG-7.5' Topographic Quadrangle, and DLG-Hydrography will be provided by LDEQ. The map will show detailed images of cropping systems utilized on the site directly affected by the constructed wetland (approx 400 acres).

Deliverable: Land use map of the affected area of the Red River Research Station. The affected acreage of row crop and pasture lands will be identified on the map. A written summary of land use will also be provided.

Schedule: Months 1-3

Payment: Federal: none

Task 2.2: Conduct a detail elevation survey of the affected area and construction site. This will be accomplished with a GPS-guided system and will be conducted by personnel of the Natural Resources Conservation Service. GPS coordinates for the site will be recorded. Attachment 1 provides the national standards that will be followed for all GPS related tasks/activities.

Deliverable: Photographs of the area and the GPS data as explained in attachment 1.

Schedule: Months 1-3

Payment: Federal: none

Task 2.3: Design Constructed Wetlands to accommodate runoff from approximately 400 acres. Engineers and hydrologists of the Natural Resources Conservation Service will create the detailed design.

Deliverable: Design plans as developed by engineers and hydrologists of the NRCS.

Schedule: Months 2-4

Payment: Federal: none

Task 2.4: Excavate over 60,000 cubic yards of soil and distribute excavated soil on adjacent lands.

Deliverable: Photographs and summary of construction activities.

Schedule: Months 6-12

Payment: Federal: \$117,000

Task 2.5: Install Deep Pond Water Release Structure and plant appropriate vegetation in the constructed wetlands.

Deliverable: Photographs of construction and planting activities. Narrative describing the water release structure and the type of vegetation planted.

Schedule: Months 6-12

Payment: Federal: \$23,500

Task 2.6: Construct access road and all necessary fencing. Best Management Practices will be used in the design and construction.

Deliverable: Photographs of construction activities and the completed structures. A narrative describing the length and type of roads and fences.

Schedule: Months 6-12

Payment: Federal: \$36,500

Task 2.7: Install erosion control vegetation mat.

Deliverable: Photographs of the established vegetation mat. A narrative describing the type of vegetation used and the installation procedures.

Schedule: Months 6-12

Payment: Federal: \$16,000

Task 2.8: Precision grade excavated soil and re-establish vegetation for pasture.

Deliverable: Photographs of construction activities and of established pasture. Narrative description of the vegetation established and the methods used to establish the vegetation.

Schedule: Months 8-15

Payment: Federal: \$6,978

Project Element III: Collection of Water Samples for Analyses to Determine Water Quality Improvement, Including Provision for, Installation and Calibration of Water Samplers in the Constructed Wetlands

Task 3.1: Construct appropriate platforms for each of the three water samplers and provide electrical service for each.

Deliverable: Photodocumentation of progression of work.

Schedule: Months 6-12

Payment: Federal: \$22,000

Task 3.2: Acquire, install, and maintain monitoring equipment for the wetland. This will include the purchase and calibration of a new Hydrolab instrument for monitoring dissolved oxygen, pH, and temperature; the purchase and installation of three water samplers and two flow meters; and the purchase and installation of a battery pack for each of the samplers. LDEQ will provide one additional flow meter which will be returned to LDEQ at the end of the contract period. The Hydrolab, three water samplers, and two flow meters purchased with funds provided by the contract will be retained by LSU at the end of the contract period.

Deliverable: Specifications for the Hydrolab unit, water samplers, and flow meters. Photographs of the sampling units with battery packs and flow meters attached.

Schedule: Months 6-12

Payment: Federal: \$38,172

Task 3.3: Collect and have analyzed water from automated water samplers to determine pollutants in water at selected locations before, within, and exiting the constructed wetlands.

Samples will be analyzed at an LDEQ-certified laboratory for nutrients, sediment, pH, and specific pesticides. Maintain a constant log of this activity. Water quality analyses should include the constituents outlined within the QAPP.

Deliverable: Copy of log records for each collection event at each station. Analyses of each sample analyzed.

Schedule: Months 12-32, dependant upon approval of QAPP.

Payment: Federal: \$187,200

Project Element IV: Education and Outreach

Task 4.1: Working with AgCenter watershed and other agents, request participation of personnel of the NRCS, and local Soil and Water Conservation District in the project. Meet at least quarterly with these agencies to communicate progress in the project.

Deliverable: List of local agency personnel that attend meetings for progress updates. Meeting summaries and copies of any material handed out.

Schedule: Months 1-32

Payment: Federal: none

Task 4.2: Conduct educational tours for local schools and appropriate departments in local universities.

Deliverable: List of local school and universities contacted for visits. Attendance sheets for students visiting the facility, copies of all material handed out, and photographs of the tours.

Schedule: Months 12-32

Payment: Federal: \$14,000

Task 4.3: Conduct tours for producers that are directly involved in agriculture and would likely benefit from implementation of a similar project. The tours will be conducted in cooperation with the NRCS, and other interested agencies.

Deliverable: List of producers and agency personnel that attend field days or tour the project. Copies of any material handed out. Photographs of tours and field days.

Schedule: Months 12-32

Payment: Federal: \$13,000

Task 4.4: Construct and maintain a website with progress of the project.

Deliverable: Web site address and links

Schedule: Months 6-32

Payment: Federal: \$15,236

Task 4.5: Prepare summarized reports of progress and submit in quarterly reports to LDEQ.

Quarterly reports include narrative documentation of all project activities and results. Accompanying deliverables as required by individual tasks upon their completion should accompany quarterly reports.

Deliverable: Quarterly reports and photodocumentation that summarizes progress of the project. Submit accompanying deliverables as required by individual tasks upon their completion with quarterly reports.

Schedule: Quarterly reports due the 10th of the month following each quarter until submission of draft final report. (January 10, April 10, July 10, and October 10).

Payment: Federal: Payment provided by percent task accomplished (see Schedule and Budget by Task).

Task 4.6: Prepare summarized reports of progress and submit in annual reports to LDEQ. Annual reports will document the results of project accomplishments that year. Statutory requirements of the Clean Water Act require that the State (LDEQ) report each year on the water quality improvement that has been achieved as a result of the program. LDEQ provides this report to EPA Region 6 in January of each year. This report is an analysis of results rather than a description of activities. Analysis of results includes discussion about such things as reduction of sediment loads, increased implementation of BMPs, and improvements of water quality.

Deliverable: Annual reports to LDEQ each calendar year of the project. The annual report will detail progress to date and will specify any problems or issues encountered during the course of the project to date.

Schedule: Annual reports due January 10th of each year until submission of the draft final report.

Payment: Federal: \$0

Task 4.7: Develop and submit a draft final report at the completion of the project to LDEQ and EPA for review. The report should give a detailed account of all activities, results, findings and recommendations of the project. All photographs, publications, etc. shall be submitted and thoroughly explained in the draft final report. Upon incorporation of LDEQ and EPA revisions to the draft final, triplicate copies of the final report shall be submitted to LDEQ. Copies of all raw data are to be included within the report.

Deliverable: Draft final and three copies of the final report.

Schedule: Month 32-36

Payment: Federal: \$29, 479 Distributed upon LDEQ and EPA approval (15% of total Federal amount withheld until EPA approval of final report.

BUDGET TABLE BY TASK, TASK PAYMENTS, AND TASK SCHEDULES

Task	Task Description	Federal	Match	Total	Schedule
Task 1.1	Develop draft QAPP for approval	\$34,608		\$1,00	Months 1-3
Task 1.2	QAPP Reviews and Revisions	\$5,000		\$500	Months 1-36
Task 2.1	Create detailed land use map of targeted sub-watershed	\$0		\$0	Months 1-3
Task 2.2	Conduct detailed elevation survey of affected construction area	\$0		\$0	Months 1-3
Task 2.3	Design Constructed Wetland	\$0		\$0	Months 2-4
Task 2.4	Excavate and distribute soil to adjacent area	\$117,000		\$117,000	Months 6-12
Task 2.5	Install water release structure in deep pond; plant vegetation in constructed wetland	\$23,500		\$23,500	Months 6-12
Task 2.6	Construct access road and all fencing	\$36,500		\$36,500	Months 6-12
Task 2.7	Install erosion control vegetation mats	\$16,000		\$16,000	Months 6-12
Task 2.8	Precision grade excavated soil and re-establish vegetation	\$6,978		\$6,978	Months 8-15
Task 3.1	Provide electrical service, construct platforms for automatic water samplers	\$22,000		\$22,000	Months 6-12
Task 3.2	Purchase, install, and calibrate monitoring equipment, samplers, and sampler accessories	\$38,172		\$38,172	Months 6-12
Task 3.3	Collect and analyze water samples	\$187,200		\$187,200	Months 12-32
Task 4.1	Request participation of various agencies, NRCS, and Local SWCD	\$0		\$0	Months 1-32
Task 4.2	Conduct educational tours for local schools and universities	\$14,000		\$14,000	Months 12-32
Task 4.3	Conduct tours for producers in cooperation with NRCS	\$13,000		\$13,000	Months 12-32
Task 4.4	Construct and maintain website for project	\$15,236		\$15,236	Months 6-32
Task 4.5	Prepare summarized reports of progress and submit quarterly to LDEQ	By tasks achieved		By tasks achieved	1/10; 4/10; 7/10; 10/10 until submission of draft final report
Task 4.6	Prepare and submit annual report to LDEQ	\$0		\$0	1/10 each year until submission of draft final report
Task 4.7	Prepare and submit a draft final report. Upon incorporation of LDEQ and EPA revisions to the draft final report, submit triplicate copies of the final report.	\$29,479		\$29,479	Months 32-36
	Match		\$429,415	\$429,415	
	TOTAL	\$558,673	\$429,415	\$988,088	

BUDGET BY CATEGORY

SALARIES/Wages	FEDERAL	MATCH	TOTAL
Co-Project Leaders		\$87,683	\$87,683
Other Professional (Research Associates)	\$75,000	\$61,730	\$136,730
Technical		\$95,722	\$95,722
Total Salaries	\$75,000	\$245,135	\$320,135
Fringe Benefits @22.5%	\$16,875	\$55,155	\$72,030
CAPITAL OUTLAY			
Water Release Structure/Installation	\$3,500		\$3,500
Access Road and Fences/Construction	\$25,500		\$25,500
Wetlands Construction (Excavation)	\$105,000		\$105,000
Precision Grade Excavated Soil	\$15,000		\$15,000
Revegetation Mat for Erosion Control	\$11,000		\$11,000
Vegetation for Critical Areas	\$10,000		\$10,000
Electrical Service to Wetlands Project	\$3,500		\$3,500
Total Capital Outlay	\$173,500		\$173,500
EQUIPMENT			
Hydrolab	\$11,000		\$11,000
Water Samplers and flow meters	\$18,150		\$18,150
Total Supplies	\$29,150		\$29,150
SUPPLIES			
Flags, tags, tapes, containers, work boat	\$19,233		\$19,233
Concrete, electrical supplies, lumber, paper	\$12,750		\$12,750
Battery packs and sludge judge	\$2,500		\$2,500
Total Supplies	\$34,483		\$34,483
OPERATING SERVICES			
Water Analyses (250 samples estimated)	\$149,000		\$149,000
Total Operating Services	\$149,000		\$149,000
TRAVEL			
In and Out-of-State	\$7,200		\$7,200
Total Travel	\$7,200		\$7,200
Facilities and Administrative Costs	\$73,465	\$129,125	\$202,590
(Federal @ 26%; Match @ 43%)			
TOTAL	\$558,673	\$429,415	\$988,088

BUDGET JUSTIFICATION

Salaries/Wages: Federal: \$75,000 Match: \$245,135

Federal funds requested will be used for salaries/wages of a research associate to complete the tasks associated with the project. The individual will be involved in all phases of the project, including construction, collecting water samples, collecting and entering data, educational tours, etc. Match will be provided through salaries of faculty/staff time of the Red River Research Station which is necessary to complete all the tasks associated with the project.

Benefits: Federal: \$16,875 Match: \$55,155

Federal funds are requested to cover cost of benefits at 22.5% of salary for the research associate. Matching funds are provided at 22.5% of faculty/staff at the Red River Research Station

Capital Outlay: Federal: \$173,500

Federal funds are requested to construct the wetlands project which includes excavating approximately 60 thousand cubic yards of soil and spreading on nearby land. Approximately 10 acres are directly involved in the constructed wetlands. The construction process also includes planting vegetation in the constructed wetland as well as affected areas to prevent erosion. An access road and fencing are needed to provide ingress to the pond area; fencing will prohibit cattle from having access to the affected area. Electrical service is necessary to provide power to the water samplers.

Equipment: Federal: \$29,150

Federal funds are requested for purchase of three water samplers, two flow meters, and a Hydrolab unit. The water samplers and flow meters will be used to automatically sample water flowing in and out of the constructed wetland. The Hydrolab unit is used to monitor temperature, pH, and dissolved oxygen content of the pond.

Supplies: Federal: \$ 34,483

Federal funds are requested for supplies needed for the project. These include flags, tags, water sample containers, concrete and lumber for water sampler platforms, electrical supplies, paper, a work boat, a sludge judge, battery packs, refrigeration units and insulation for the samplers, and sampler recording supplies.

Operating Services: Federal: \$149,000

Requested funds will be used for analysis of approximately 250 water samples collected prior to runoff entering the constructed wetland, after water has entered the large pond of the wetland, and as water exits the wetland. Samples will be analyzed for nutrients and pesticides (identified previously) by an LDEQ approved laboratory.

Travel: Federal: \$ 7,200

Funds are requested for in- and out-of-State travel to visit other wetland sites to exchange information and to present findings of the project to interested organizations and to the scientific community. Funds will also be used for travel expenses incurred for transporting water samples for analyses.

Facilities & Administrative Costs: Federal: \$73,465 Match: \$129,125

Federal funds are requested at 26% Modified Total Direct Costs. Matching funds are contributed at the federally negotiated rate of 43% Modified Total Direct Costs

Mandeville Neighborwoods Project:

INTRODUCTION

The City of Mandeville is located in a picturesque setting on the north shores of Lake Pontchartrain. The natural landscape and close proximity to Lake Pontchartrain have created an attractive location for people to live. As a result, residential subdivisions are expanding throughout the City as well as other communities along the lakefront. This has caused the amount of “green space” or natural areas along the lakefront and inland to decline. As Mandeville has grown, residential development has increased, which has resulted in a decline in the quality of the natural environment and an increase in environmental pollution. This is presenting a challenge for residents who were originally drawn to Mandeville because of the extensive green spaces and the unpolluted environment.

Stormwater runoff from residential lawns, streets, and parking lots is known to contain pollutants that can degrade the water quality in local receiving streams. Urban areas have greater amounts of impervious surfaces, which reduce the amount of infiltration and percolation of stormwater. Today city planners, local politicians, and the local residents have become more interested in environmental friendly and cost-effective management practices that are known to control urban NPS pollution. Therefore, *The Louisiana Department of Environmental Quality and the City of Mandeville* have agreed to implement this project, entitled “*Mandeville Neighborwoods*”. The project will demonstrate how “green space” (i.e. an undeveloped parcel of land) can be used to manage urban stormwater runoff and to also serve as a neighborhood park. The project site will also demonstrate several different types of “wetland theme gardens”, which will emphasize a naturalized approach for mitigating stormwater that is cost effective and complimentary to the landscape. Once complete, the Mandeville Neighborwoods site will provide local residents opportunities for passive recreation and nature watching opportunities, biking, and environmental education. The park will become integrated as a “leg” of an existing bike trail that traverses along the shores of Lake Pontchartrain and through the City of Mandeville.

The project site is located within the State’s Watershed Subsegment 040803. The area encompasses the *Lower Tchefuncte River from La. Hwy 22 to Lake Pontchartrain*. It is described as an “estuarine” environment. The project site drains into an unnamed drainage ditch, which drains into Bayou Chinchuba, and into the Tchefuncte River near its mouth, thence into Lake Pontchartrain.

Water Quality Status

The State’s 2000 303(d) List of “impaired” waterbodies indicates that the designated uses for subsegment 040803 are not being met. These uses include:

- 1) *Primary and Secondary Contact Recreation* - supported by a fecal coliform water quality standard of 200 MPN/100ml and 1000 MPN/100ml, respectively;
- 2) *Fish and Wildlife Propagation* - supported by a water quality standard of 4.0 mg/l dissolved oxygen.

This project will focus on reducing Urban Nonpoint Source Pollutants within the Subsegment 040803. The project will also demonstrate to other communities on the “North Shore” how these methods can be utilized to reduce pollution in their local waterbodies.

PROJECT GOALS AND OBJECTIVES

The project goal is to increase environmental education and outreach regarding urban NPS stormwater pollution in an effort to increase environmental awareness and implementation of stormwater management practices. The project objectives are to:

- Demonstrate management practices for controlling urban NPS pollution;
- Monitor the effectiveness of the stormwater controls;
- Serve as a neighborhood park for walking, jogging, and public environmental education and outreach opportunities.

PROJECT ELEMENTS

Project Element I – Site Assessment, Planning, and Design

Utilize the land previously purchased for project site. A site assessment characterizes the site and provides information that is used during the planning process. The assessment gathers information regarding natural features, such as hydrology, topography, man-made structures, and utilities that may be present. The planning process incorporates the assessment information together with input from specialists and the public into the project design. Local meetings will be hosted to include entities of government, landscapers, engineers, biologists, environmental groups, and local residents in order to gather input and support for the project.

Task 1.1 Utilize land selected for project site. See land dedication.

Deliverable:

- There is no deliverable for this item.

Federal	Match	Total	Schedule/Due Date
\$0	\$350,000	\$350,000	Month 1

Task 1.2 Acquisition of existing base maps for the site, obtain environmental information, and assemble information relative to existing water, sewer, gas, and electric utilities, storm water flows, and boundary topographic surveys available.

Deliverable:

- Digital image of the site indicating information pertinent to environmental conditions, utilities, site hydrology (flow direction and capacity), and site survey information.

Federal	Match	Total	Schedule/Due Date
\$4,700	\$2,000	\$6,700	Months 2-5

Task 1.3 Perform an extensive site inventory, which identifies soils, hydrologic features, existing access points, and wetlands. Perform analysis of site inventory data relative to the Neighborwoods project and develop a program for the Neighborwoods project that the site is capable of accepting.

Deliverable:

- Inventory consisting of existing soils, hydrology (flow direction and capacity), and wetlands (plant types and distribution).
- Site Analysis based on the existing conditions discovered during the site inventory.

Federal	Match	Total	Schedule/Due Date
\$9,000	\$6,000	\$15,000	Months 3-30

Task 1.4 Establish a Steering Committee of government, citizens, and technical experts (landscapers, engineers, and biologists) for the project, organize and conduct design review meetings including public comment meetings, and present design development to Mandeville Mayor and City Council.

Deliverable:

- Provide names and titles of committee members, i.e. John Doe – local resident, Jane Doe – landscaper, ...etc;
- Provide meeting solicitations/notices;
- Provide the meeting itinerary, attendance list, and summary for each meeting;
- Schematic plans, maps and/or sketches showing progress of design development.

Federal	Match	Total	Schedule/Due Date
\$17,200	\$8,000	\$25,200	Months 1-30

Task 1.5 Develop a final master plan for the project that synthesizes the efforts executed in Task 1 and 3 including the information derived from the Steering Committee meetings and public comment. The master plan will be the final conceptual plan for the project.

Deliverable:

- Plans, sections, elevations, and supporting data.
- Draft and Final Master Plan

Federal	Match	Total	Schedule/Due Date
\$4,230	\$2,820	\$7,050	Months 3-30

Project Element II – Water Quality Monitoring Activities

Water quality monitoring will be conducted at the project site in order to assess the effectiveness of the wetlands and other stormwater treatment controls for managing stormwater runoff. An approved “Quality Assurance Project Plan” (QAPP), which is used as a mechanism to insure quality control involving project water monitoring activities, must be in place before any monitoring begins. Strategically locate water sample collection sites that measure the flow and the water quality as the stormwater runoff enters and exits the site. Water samples will be collected and analyzed in an approved LDEQ accredited laboratory. Vegetation will also be monitored in order to assess its response to the increased amounts of water and nutrients.

Task 2.1 Prior to any water quality data collection, a Quality Assurance Project Plan (QAPP) will need to be developed and submitted to LDEQ and USEPA for review, comment and approval. All water quality analysis will have to be performed in a LDEQ accredited laboratory if federal or matching funds from the project are utilized.

Deliverable:

- Provide draft and final QAPP to LDEQ and EPA for review, comment and approval.
- Once the QAPP is EPA approved, provide a digital copy and hard copy of the document to all persons on the "QAPP Distribution List".

Federal	Match	Total	Schedule/Due Date
\$3,000	\$2,000	\$5,000	Months 1- 4

Task 2.2 Purchase the following equipment for collecting water level and water chemistry data:

1. Ecotone water level monitor CP088030 Instrument
2. Palm Pilot
3. Lap top computer- Powerbook G4, 15 inch
4. Bottles, filters, & vials

Deliverable:

- There is no deliverable for this item.

Federal	Match	Total	Schedule/Due Date
\$3,600	\$0	\$3,600	Months 1-4

Task 2.3 Establish water level station(s) and take measurements. Measurements of water level will be taken daily in the receiving wetland using an automatic water level recorder. The automatic water level recorder will be calibrated with discrete water level measurements and set to record water level once per day at 0800 hours.

Deliverable:

- Location map or sketch of the water level station(s);
- Figures of water level trends inside the wetlands showing impacts of weather patterns and stormwater input;
- Analysis of water level trends.

Federal	Match	Total	Schedule/Due Date
\$9,460	\$5,000	\$14,460	Months 1-30

Task 2.4 Establish water quality sampling stations at selected sites to measure water quality draining into and out of the site. Grab samples will be used. The targeted parameters to be monitored will follow the sampling protocol in the Approved QAPP.

Deliverable:

- Analysis of water quality sampling provided on an annual basis.

Federal	Match	Total	Schedule/Due Date
\$12,765	\$5,000	\$17,765	Months 1-33

Task 2.5 Transects will be established in project area to measure vegetation. Density and basal area of each species will be calculated for trees. Tree species composition analysis will be carried out yearly.

Deliverable:

- Tables of species composition, relative density, relative dominance, relative frequency and importance value.
- Analysis of vegetation structure.

Federal	Match	Total	Schedule/Due Date
\$9,000	\$6,000	\$15,000	Months 1-30

Project Element III – Administration of Construction

Incorporate the design plan and concepts into an executable format that includes specifications and drawings of all components, which will be present at the site. Develop and implement a solicitation process for obtaining construction bids for work at the site that provides equal opportunity for interested contractors. Implement a mechanism for assuring quality control throughout the construction of the project. Construct project.

Task 3.1 Preparation of plans and specifications that adequately describe the project for a public bid process. Elements of this Task include detail drawings, written technical specifications, and front-end specifications (by City) to describe areas to be cleared, grading and drainage, layout of project amenities, pedestrian and vehicular accesses, utilities, structures, landscape planting designs, wetlands creation, water sampling, and education amenities.

Deliverable:

- Detail drawings and front-end and technical specifications specific to the project elements.

Federal	Match	Total	Schedule/Due Date
\$23,125	\$6,000	\$29,125	Months 3-30

Task 3.2 Public advertisement, dissemination of plans and specifications, and receipt of bids from licensed contractors for the construction of the project. Additionally, overseeing the award and contract execution of the successful contractor of the project.

Deliverable:

- Copies of submitted and successful contractor bidding information, bonds, etc.

Federal	Match	Total	Schedule/Due Date
\$6,000	\$4,000	\$10,000	Month 30

Task 3.3 Oversight of the construction activities, resolution of unforeseen site conditions relative to the project program, review of contractor's submittals, preliminary approval of contractor's invoices for forwarding to the City's program manager, and inspection of contractor's workmanship and materials with regards to compliance with the construction documents.

Deliverable:

- Resident inspection reports on the daily work activities of the contractor.

Federal	Match	Total	Schedule/Due Date
\$24,053	\$11,330	\$35,383	Months 31-35

Task 3.4 Construction of site improvements including clearing, drainage/stormwater management facilities, planting, boardwalk system, walking trails, theme gardens, detention basin and wetlands creation.

Deliverable:

As built record drawings.

Federal	Match	Total	Schedule/Due Date
\$290,000	\$0	\$290,000	Months 31-35

Project Element IV – Education Amenities, Outreach, and Recreation

Education and recreation are an integral part of a healthy and sustainable community. Providing a program that offers environmental education, environmental outreach, and outdoors recreational opportunities helps to enlighten the local public and encourage environmental stewardship. "Neighborwoods" is intended to demonstrate as well as educate residents living along the north shore of Lake Pontchartrain regarding on-site stormwater controls and wetland theme gardens, which they can utilize at their existing home site or new development.

Task 4.1 Design and implement web site to provide information to residents, students, teachers, subdivision developers and elected officials on the project design, development, and schedule. It will serve as a feedback mechanism to project leaders for ongoing community input. Implement, test, and train community volunteers for maintenance of web site.

Deliverables:

- Goals and objectives for the web site;
- Website plan, design and images;
- List of “trained” volunteers for website maintenance;
- Address/Link to “Neighborwoods” website.

Federal	Match	Total	Schedule/Due Date
\$3,000	\$2,000	\$5,000	Months 3-30

Task 4.2 Develop and provide a “Nonpoint Source Pollution” Educational Outreach Program for Neighborwoods including:

- Develop lesson plans that focus on Best Management Practices (BMPs) for controlling urban nonpoint source pollution from storm water runoff;
- Develop and implement a “Teacher Inservice” to perform lessons to local schools and other public organizations;
- Develop brochures for schools and local public highlighting the educational opportunities provided by Neighborwoods, including related contact information.

Deliverables:

- Provide “Draft” version of each “lesson plan” for LDEQ review and comment;
- Provide Final Lesson Plan;
- Agenda and attendance sheet for teacher inservice(s);
- Copy of brochures.

Federal	Match	Total	Schedule/Due Date
\$15,000	\$10,000	\$25,000	Months 3-30

Task 4.3 Provide opportunities and perform activities involving native wetland plant species identification. Organize events for local schools and local residents to attend that involve identification of native wetland plant species found at the Neighborwoods site, as well as to learn about their function in the local landscape.

Deliverables:

- List and location of native wetland plant species identified on Neighborwoods site

Federal	Match	Total	Schedule/Due Date
\$1,800	\$1,200	\$3,000	Month 3-30

Task 4.4 “Develop Static Interpretations of Featured Best Management Practices and Wetland Species” at the Neighborwoods Site. Create text for best management practices utilized. Develop templates that include pictures and text for static interpretation kiosks.

Deliverables:

- Copies of created text that explains best management processes being utilized;
- Templates for Static Interpretation Kiosks

Federal	Match	Total	Schedule/Due Date
\$1,200	\$800	\$2,000	Months 3-30

Task 4.5 Implement Lessons developed in Task 4.2. Present the lessons to student in grades 5-12. Prior to presenting lessons to students, conduct a survey that assesses the level of knowledge regarding urban nonpoint source pollution, best management practices, native wetland plants, and weeds. Develop student and teacher evaluation for each lesson.

Deliverables:

- Documentation of field trips including school names, grade levels of students, number of teachers, students, and chaperones attending;
- Copy of student teacher pre and post survey including results for each event;
- Copy of student and teacher evaluation for each event.

Federal	Match	Total	Schedule/Due Date
\$3,000	\$2,000	\$5,000	Months 3-30

Program Element V: Quarterly, Annual and Final Reporting

The City of Mandeville will be responsible for ensuring that quarterly, annual and final reports are provided to LDEQ on the project. Quarterly reports will be provided on January 1, April 1, July 1, and October 1 of each year. An annual report will be provided on December 1, of each year and it will summarize the results and progress made within the project, any water quality data that has been collected and highlight the successes and problems that have been encountered within the project. A draft final report will be provided to LDEQ for their review, comment and submittal to USEPA Region 6. Ten percent of the federal funds allocated for the project will be withheld until USEPA approves the final report. Once the report has been approved by USEPA, three hard copies and one digital copy of the approved final report will be provided to LDEQ.

Task 5.1 Prepare summarized reports of progress and submit in quarterly a report to LDEQ.

Deliverable: Quarterly reports include narrative documentation of all project activities and results. Accompanying deliverables as required by individual tasks upon completion with the quarterly reports.

Federal	Match	Total	Schedule/Due Date
\$0	\$2,800	\$2,800	Months 3-30*

***Schedule:** Quarterly reports due by the 10th of the month following each quarter. (January 10, April 10, July 10, and October 10).

Task 5.2 Prepare a summarized report of progress and submit in an annual report to LDEQ.

Deliverable: Annual reports to LDEQ each calendar year of the project that details progress to date and will specify any problems or issues encountered during the course of the project to date.

Federal	Match	Total	Schedule/Due Date
\$0	\$2,000	\$2,000	Months 11 – 30*

***Schedule:** Annual reports are due December of each year during project period.

Task 5.3 Develop and submit a draft final report upon completion of the project to LDEQ for review. The report should give a detailed account of all activities, results, findings, and recommendations of the project. All photographs and finished deliverables etc. shall be resubmitted and thoroughly explained in the final report. Upon incorporation of LDEQ revisions to the draft final, triplicate copies of the final report and all deliverables shall be submitted to LDEQ.

Deliverables: Provide LDEQ a draft final report detailing the accomplishments, highlights, and findings learned throughout project implementation.

Federal	Match	Total	Schedule/Due Date
\$1,650	\$1,100	\$2,750	Month 32

Task 5.4 Develop and submit a final report upon completion of the project for LDEQ and eventual EPA approval. Upon incorporation of LDEQ revisions to the draft final, triplicate copies of the final report and all deliverables shall be submitted to LDEQ.

Deliverables: Provide LDEQ a final project report detailing the accomplishments, highlights, and findings learned throughout project implementation.

Federal	Match	Total	Schedule/Due Date
\$1,200	\$800	\$2,000	Month 35

Project Schedule and Budget by Task

Task	Task Description	Federal	Match	Total	Schedule
1.1	Land Purchase	\$0	\$350,000	\$350,000	Month 1
1.2	Site Assessment	\$4,700	\$2,000	\$6,700	Months 2-5
1.3	Site Inventory	\$9,000	\$6,000	\$15,000	Months 3-30
1.4	Design Planning	\$17,200	\$8,000	\$25,200	Months 1-30
1.5	Master Plan	\$4,230	\$2,820	\$7,050	Months 3-30
2.1	QAPP	\$3,000	\$2,000	\$5,000	Months 1-4
2.2	Water Testing	\$3,600	\$0	\$3,600	Months 1-4
2.3	Water Level	\$9,460	\$5,000	\$14,460	Months 1-30
2.4	Water Quality	\$12,765	\$5,000	\$17,765	Months 1-33
2.5	Vegetation	\$9,000	\$6,000	\$15,000	Months 1-30
3.1	Construction Site	\$23,125	\$6,000	\$29,125	Months 3-30
3.2	Construction Bids	\$6,000	\$4,000	\$10,000	Month 30
3.3	Implement	\$24,053	\$11,330	\$35,383	Months 31-35
3.4	Site Improvements	\$290,000	\$0	\$290,000	Months 31-35
4.1	Neighborhoods	\$3,000	\$2,000	\$5,000	Months 3-30
4.2	Neighborhoods NPS	\$15,000	\$10,000	\$25,000	Months 3-30
4.3	Native Plant	\$1,800	\$1,200	\$3,000	Months 3-30
4.4	Static Interpretation	\$1,200	\$800	\$2,000	Months 3-30
4.5	Implement NPS	\$3,000	\$2,000	\$5,000	Months 3-30
5.1	Quarterly Reporting	\$0	\$2,800	\$2,800	Months 3-30*
5.2	Annual Reporting	\$0	\$2,000	\$2,000	Months 11-30*
5.3	Draft Final Project	\$1,650	\$1,100	\$2,750	Month 32
5.4	Final Project Report	\$1,200	\$800	\$2,000	Month 35
	PROJECT TOTALS	\$442,983	\$430,850	\$873,833	

BUDGET BY CATEGORY

	FEDERAL	MATCH	TOTAL
PERSONNEL	\$109,292	\$80,850	\$190,142
TRAVEL	\$11,000	\$0	\$11,000
SUPPLIES	\$3,600	\$0	\$3,600
OPERATING SERVICES	\$29,091		\$29,091
LAND PURCHASE	\$0	\$350,000	\$350,000
SITE IMPROVEMENTS	\$290,000	\$0	\$290,000
PROJECT TOTALS	\$ 442,983	\$ 430,850	\$ 873,833

Budget Justification

Personnel	\$109,292	(Federal)	\$80,850	(Match)
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The federal funds requested for personnel cost, will be utilized to pay for the project manager, senior scientist, field scientist, and wetland ecologist time to conduct field site visits and collect environmental data. Federal funds are requested to pay for web designer and web master. The federal funds requested for personnel cost, will also be utilized to pay for the project manager/landscape architect, civil engineer, draftsmen, specification writer and the resident inspection and construction administration of the project site.

Travel	\$11,000	(Federal)	\$0	(Match)
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The federal funds requested for travel cost, will be utilized to pay for the environmental project manager, wetland ecologist, field scientist and wetland ecologist to attend planning meetings, conduct field investigations, collect water and nutrient samples. Travel funds will also enable the web page designer and web master to attend project team meetings and community leaders meetings.

Supplies	\$3,600	(Federal)	\$0	(Match)
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The federal funds requested for different types of supplies including items to collect water and nutrient samples, process scientific data, and analyze the information.

Operating Services

& Equipment	\$29,091	(Federal)	\$0	(Match)
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The federal funds requested for the types of operating services such as processing field data, collecting field information on water, nutrients and vegetation. Federal funds are requested for analytical technical services for processing water and nutrient samples. Web page design and implementation will entail use of digital images, and maps.

Land Purchase	\$0	(Federal)	\$350,000	(Match)
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There are no federal funds requested for the land previously purchase.

Site Improvements	\$290,000	(Federal)	\$0	(Match)
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The federal funds requested for site improvements include clearing, drainage/stormwater management facilities, planting, boardwalk system, walking trails, theme gardens, detention basin and wetlands creation.

PROJECT TOTALS	\$ 442,983	(FEDERAL)	\$ 430,850	(MATCH)
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